ELECTRICAL WEST

June 1954
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

Teamwork in PCEA..... 104

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Control the Labor Factor..... 97

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IT FIGURES!

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Light's Diamond Jubil
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But we think that fr
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story are most signific

1 At the beginning of this
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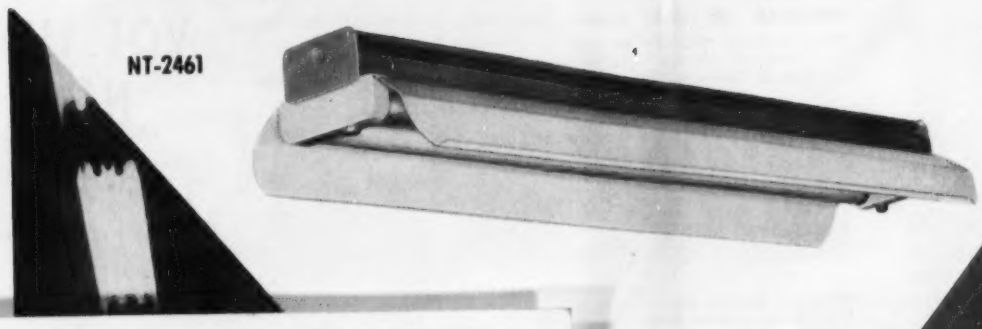
was up to 502 kilowatt-h
the home consumer uses a
annually.

2 Cost of electricity for th
1882 was about 24 cents
1907, the average cost had
the average was 5.6 cent
average Edison domestic customer pays less than 3.0 cents
per kilowatt-hour for electricity.

Certainly a vital role in the appliance selling story, too, has been played by electricity's consistent pattern of "wider use—lower cost". In Central and Southern California, Edison has been following that pattern for more than half a century!

SOUTHERN CALIFORNIA EDISON COMPANY



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he factory it lights!

USTRO-LUX

MASTER FLOOD

168 RECESSED TROFFER

PM-284 COLLEGIATE

EDUCATOR

STANDARD DOME

quality workmanship = quality

This is the formula for the plant that needs to cut cost without impairing efficiency. The handsome NT-2461 Industro-Lux is sturdily built, engineered to deliver the proper lumens to a job, and scientifically designed for simplified installation anywhere. All Smoot-Holman fixtures eliminate the frequent repairs and worker errors chargeable to "bargain" lighting. Other fine Smoot-Holman equipment brings the economy of quality to office, institution and outdoor installations. Specify and Install "QUALITY"— THERE IS A DIFFERENCE—

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA

SALES OFFICES IN MOST PRINCIPAL CITIES • BRANCH OFFICE—WAREHOUSE SAN FRANCISCO

IT FIGURES!

Light's Diamond Jubilee year has provided the electric industry with a great opportunity for telling its success story. It is a story of progress unparalleled by that of any other industry, anywhere.

But we think that from the point of view of electrical appliance dealers, some of the smaller figures in the story are most significant:

1 At the beginning of this century, average home consumption of electricity in the United States was less than 200 kilowatt-hours per year. In 1929 the average consumption was up to 502 kilowatt-hours. Today, in Edison territory, the home consumer uses an average of 1,829 kilowatt-hours annually.

2 Cost of electricity for the average domestic customer in 1882 was about 24 cents per kilowatt-hour nationally. By 1907, the average cost had dropped to 10.5 cents. By 1932, the average was 5.6 cents per kilowatt-hour. Today the average Edison domestic customer pays less than 3.0 cents per kilowatt-hour for electricity.

Certainly a vital role in the appliance selling story, too, has been played by electricity's consistent pattern of "wider use—lower cost". In Central and Southern California, Edison has been following that pattern for more than half a century!

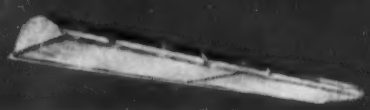
SOUTHERN CALIFORNIA EDISON COMPANY

NT-2461

efficient as the factory it lights!

INDUSTRO-LUX

MASTER FLOOD



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STANDARD DOME

Quality material + quality workmanship = quality Smoot-Holman lighting. This is the formula for the plant that needs to cut cost without impairing efficiency. The handsome NT-2461 Industro-Lux is sturdily built, engineered to deliver the proper lumens to a job, and scientifically designed for simplified installation anywhere. All Smoot-Holman fixtures eliminate the frequent repairs and worker errors chargeable to "bargain" lighting. Other fine Smoot-Holman equipment brings the economy of quality to office, institution and outdoor installations. Specify and Install "QUALITY"— THERE IS A DIFFERENCE—

SMOOT-HOLMAN

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JUNE 1954

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-sixth year of publication.

VOL. 112 NO. 6

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Associate Editor — John Cootz, Typography

Next Month

In engineering there will be a worthwhile piece on various labor-saving equipment and tools used by Portland General Electric Co. for line work in its outside divisions.

An important new piece of equipment that will be described is an electrically operated, glass-insulated extension ladder.

After 30 years Laguna Bell, 220-kw substation of Southern California, has been rebuilt and modernized. Comparison of the old and new shows marked change in technology through the years.

Cowlitz County PUD has developed an aluminum structure substation that has reduced costs. Features of this will be covered. Way off on the Island of Hawaii they have problems too. Design of a new transmission line will prove of interest.

For industrial power engineers there will be another article on modern foundry practice. This one is on dielectric core baking. It should help to sell similar jobs.

The completely mechanized bulk sugar loading plant on the Island of Kauai, with its ingenious automatic controls, will be drawn and explained.

Reawakened selling and promotional activity in all parts of the West is worth noting and many of the newest ideas employed will be reported that others may adopt and adapt.

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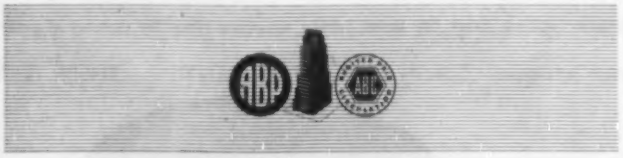

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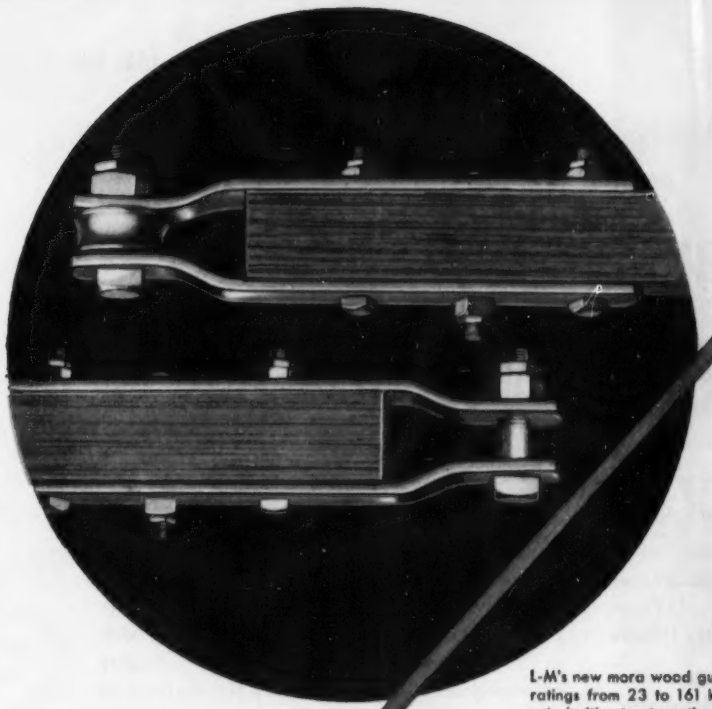
ELECTRICAL WEST (with which is consolidated The Journal of Electricity). JUNE 1954. Vol. 112, No. 6. Published monthly by McGraw-Hill Company of California. **Publication office, 1111 Wilshire Blvd., Los Angeles 17, California, Editorial and Advertising Offices: 68 Post St., San Francisco 4, Calif.** James H. McGraw (1860-1948), Founder; Donald C. McGraw, Chairman of the Board; George C. Tenney, President; John W. Otterson, Vice-President; B. M. Baccoli, Secretary and Treasurer. **Subscriptions: Address correspondence to Electrical West—Subscription Service, 68 Post St., San Francisco 4, Calif. Allow 30 days for change of address. Please indicate position and company connection on all subscription orders.** Single copies 25c. Subscription rates—U. S. possessions and Latin American Republics: $2 a year; $3 for two years; $4 for three years. Canada $2.50 a year; $5 for three years. All other countries $3 a year; $5 for two years; $6 for three years. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the act of March 3, 1879. Printed in U.S.A. Copyright 1954 by McGraw-Hill Company of California. All rights reserved.



L-M's new mora wood guy insulators come in ratings from 23 to 161 kv, in conservatively rated ultimate strengths of 15,000, 25,000, and 35,000 pounds. Mora is extremely low in moisture absorption, highly resistant to fire and shattering; is dense and very strong, and provides an insulator with extremely long life. Mora wood insulators are provided with galvanized steel end-plates, with bolt at one end, and one or two rollers for guy strand at the other.

New L-M Mora Wood Guy Insulators Resist Shattering and Burning

New wood from equatorial tropics has extremely low rate of moisture absorption, high tensile strength.

In the jungles of South America, along the equator, grows the mora tree, which provides an unusual type of wood. Mora wood has been used extensively in dock and pier construction, in warehouse flooring and shipbuilding, because of its extreme strength and toughness and its low rate of moisture absorption.

These qualities make mora wood a most desirable material for guy strain insulators. Mora's natural resistance to all types of decay puts it in the same class as pressure-treated domestic woods—yet it needs no treating.

Low Moisture Absorption

Air-dried samples of mora and fir with a moisture content of 12% were submerged for 10 hours. At the end of that period the mora wood samples averaged 16% moisture content, while the fir samples averaged 30%. In a 24-hour test of oven-dried samples, mora absorbed only 9.8% of its oven-dried weight, while fir absorbed 40%.

Resists Shattering

Mora is slow burning. It has great ability to resist the damaging effects of surges. We take advantage of this fact to eliminate arcing horns from the insulator, allowing cleaner, safer construction of guyed installations. Mora insulators are designed to provide an impulse strength approximately twice the BIL of each rated voltage class. Mora wood weighs about 65 pounds per cubic foot. It is about three times as hard as Douglas Fir.

Mora has far higher resistance to shattering on impulse tests than fir. A steep front wave with a crest value of 340 kv was applied to 12-inch lengths of both mora and fir. After a given number of shots, varying from 1 to 5, the fir split along the grain so badly that no mechanical strength remained. The mora wood samples showed some fibre shredding on the surface, but even after six shots the mora was still sound and retained nearly 100% of its mechanical strength.

Sizes and Ratings

Mora guy strain insulators are available in 15 sizes, in voltage classes from 23 to 161 kv, with ultimate strength ratings of 15,000, 25,000 and 35,000 pounds. Lengths for these ratings range from 4 ft. 6¾ in. to 13 ft. 10¼ in. All sizes are provided with hot-dip galvanized steel metal plates bolted to the wood members, with through bolt at one end for pole attachment, and roller at the other end (2 rollers on 35,000-pound strength insulator) to reduce wear on guy strand.

Get Complete Information

Ask the L-M Field Engineer to show you a sample of mora wood and give you a complete list of ratings and sizes available. Or write Line Construction Material Division, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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LINE MATERIAL

Line Construction Materials

Wagner®
TRANSFORMERS
...the choice of leaders
in industry

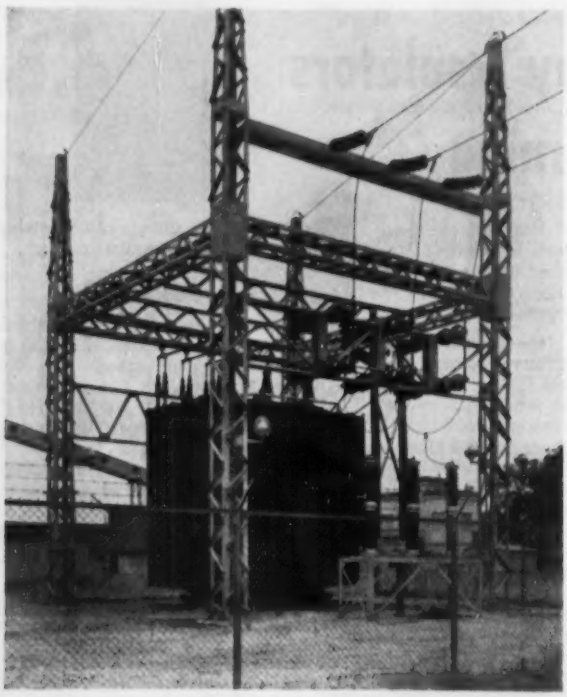
Kansas City, Kansas installs Wagner Transformer to assure across-the-city service

Kansas City's Board of Public Utilities has recently installed this 20,000/25,000 kva Wagner Power Transformer at the Municipal Plant, Quindaro Power Station, Kansas City, Kansas.

Quindaro steps up generator voltage from 13,800 to 67,000 volts for across the city service.

A Wagner Transformer was chosen for this installation, as Wagner Transformers are for many power systems and industrial plants, because of their ability to give adequate and reliable service over unusually long periods of time. Wagner Power Transformers have been serving the power industry dependably for over sixty years. Service records from the field, dating back to the Gay Nineties prove their ability to give extremely reliable service. They are compact in design and are built with great care to give them inherent strength and stability. They have sufficient capacity not only to carry their rated loads, but to be able to handle overloads whenever emergencies arise.

* * *

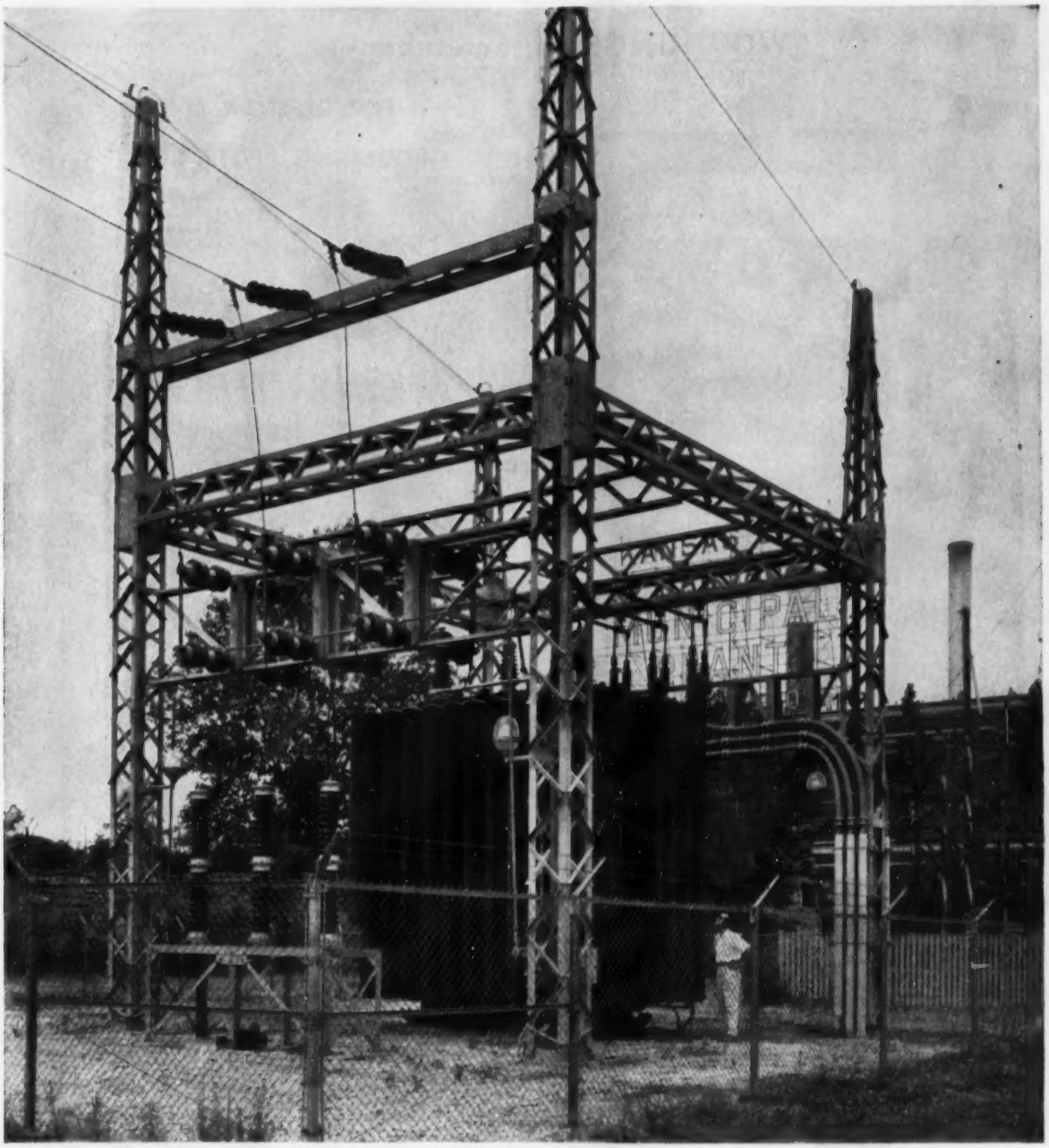


Wagner has all the manufacturing facilities and years of engineering "know-how" necessary to manufacture reliable power transformers. Why not consider Wagner Power Transformers for your next installation? 32 branch offices, located in principal cities, are maintained for quick, convenient engineering service and consultation.

If you need power transformers rated 10,000 kva and below—three phase, or 5,000 kva and below—single phase, why not check ASA C57.12a Standards and use them as your specifications? In addition to saving the cost of preparing specifications, you will also realize a substantial saving in price by using Wagner Standard Transformers.

Bulletins TU-180 and TU-181 give full information on Wagner Power and Distribution Transformers. Write for your copies today.

Wagner Electric Corporation
EST. 1891



20,000/25,000 kva Wagner Power Transformer at Kansas City, Kansas. Provisions have been made for blowers to be added when required to increase its rating to 33,333 kva.

WAGNER ELECTRIC CORPORATION
6381 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

T54-6

TWO THINGS to remember --

FOR DEPENDABLE
GROUNDING PROTECTION

1 DRIVE

Copperweld TRADE MARK
SECTIONAL
GROUND RODS
DEEP
FOR YEAR 'ROUND
PROTECTION

2 MEASURE

RESISTANCE OF EACH SECTION

ALLOW FOR
SEASONAL
VARIATION

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"Practical Grounding"

Its 36 pages are packed with the latest authoritative information on GROUNDING. A copy belongs in the files of every engineer responsible for planning reliable low-resistance grounds. Write for your copy today.

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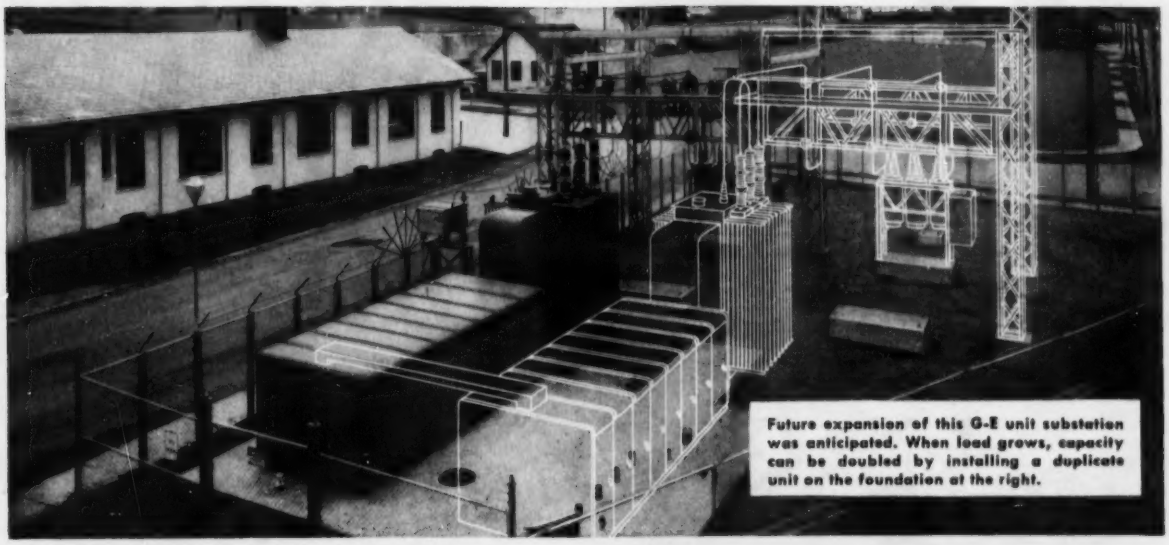
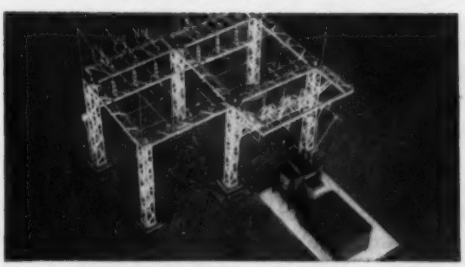
TOP PERFORMANCE FROM PROTECTIVE EQUIPMENT DEPENDS ON LOW-RESISTANCE GROUNDS



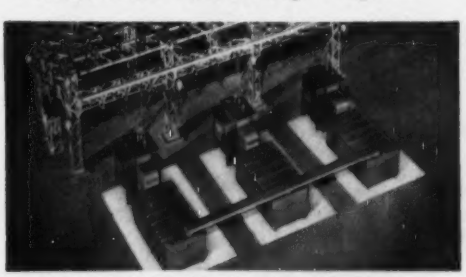
Future expansion of this G-E unit substation was anticipated. When load grows, capacity can be doubled by installing a duplicate unit on the foundation at the right.

This General Electric substation is designed to grow with your load



1954 Single unit is installed, but load growth is anticipated and additional steel structure is also installed at this time.

1956 Capacity doubled to meet load growth. Bus tie provides emergency interconnection to restore service in case of outage on high side.



1958 Capacity tripled as load growth continues. Low-voltage-selective arrangement provides service continuity in emergency.

And with this arrangement, it's easy to—

1. double or triple capacity by adding duplicate units

2. add additional "match and line-up" feeders

3. make connections to the high-tension structure

General Electric unit substations make it both easy and economical to supply growing loads. By adding capacity in small units, as shown at the left, utilities avoid investing in overcapacity which will not be used for years—and which may never be used.

With G-E unit substations, it's easy to increase capacity by simply adding additional units. In this low-voltage selective arrangement, a bus tie with normally open tie breaker provides an emergency interconnection between the low-voltage sides of two or more individual substations. This permits restoration of service following an outage of either a transformer or high-voltage circuit.

Additional "match and line-up" feeders can easily be added to this design because the ends of the switchgear are accessible—not bottled up as in the case of double-ended substations. Additional match and line-up feeders will be available from the factory for years after the original equipment was purchased.

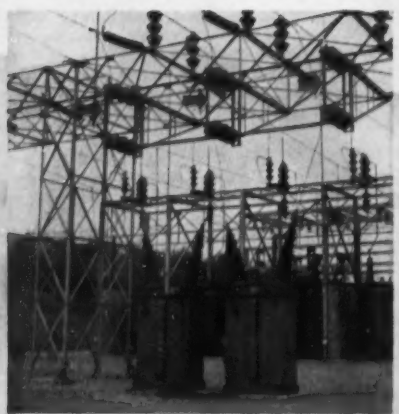
Standard high-voltage steel structure is another factor in easy expansion. It's easy to add to the structure if more lines are brought in, or if more units are added.

For further information about unit substations that provide easy expansion with a bonus in service continuity, ask your G-E apparatus representative for bulletins GEA-3800 and GEA-5847 or write to General Electric Company, Schenectady 5, New York. 513-2

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

S&C does it



SMD-1 Fuses have been in actual field service since March, 1952. The fuses have had many occasions to clear faults, and have done so successfully in each case.

S&C leads the way with another great advance in the fusing art—a *500,000 kva* power fuse designed for application to primaries of power transformers tapped directly on transmission and subtransmission lines; it is also designed for station service and potential transformer protection, and for sectionalizing.

Announcement of the Type SMD-1 Power Fuse comes as the culmination of many years of research, engineering, laboratory and field testing. It marks another FIRST by those who pioneered successively such fuse advances as (1) stored energy for terminal separation, (2) nondamageable fusible elements, (3) dropout action, (4) the single bore principle in boric acid fuses, (5) carbon dioxide for arc extinction, and (6) stress cones to give high external flashover characteristics.

HOW THE TYPE SMD-1 POWER FUSE EVOLVED:

S&C's fusing FIRSTS—mentioned above—brought to the industry in 1945 a million kva dropout boric acid fuse suitable for use at transmission and subtransmission voltages. This fuse—S&C's Type SMD-2—had a technical excellence equal to the most advanced types of circuit interrupting devices.

The SMD-2 engineering achievements have now been extended by development of the SMD-1 Fuse which is designed to provide protection on transmission and subtransmission systems where faults do not exceed 500,000 kva.

The SMD-1 is available in ratings at 34.5 kv, 46 kv, and 69 kv. Complete information is contained in this new Catalog Section 261 . . . available on request.

SPECIALISTS IN HIGH-VOLTAGE

again!

The New

Type SMD-1 Power Fuse

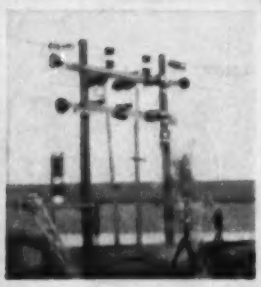
rated at

500,000 kva

3-phase

symmetrical

at 69 kv



HOW IT WAS TESTED:

Type SMD-1 Fuse has been subjected to a unique testing program. It has had not only conventional laboratory tests but also very extensive field tests under a wide variety of circuit and fault conditions. Above is a snapshot of one of the more recent tests conducted in collaboration with engineers of a large eastern utility. Maximum fault interrupted: 560,000 kva symmetrical 3-phase at 66,000 volts.

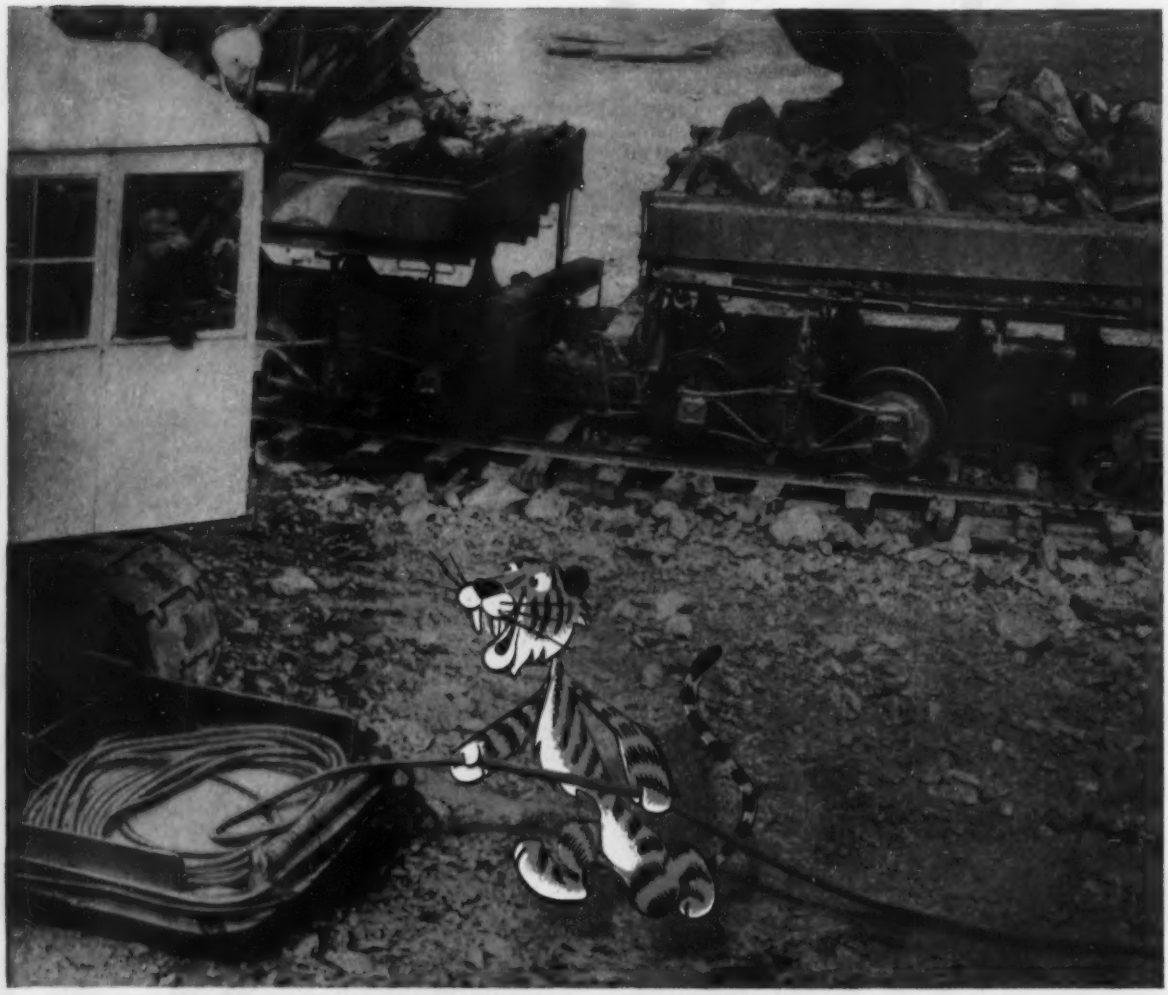
S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS, U. S. A.

IN CANADA: S&C ELECTRIC CANADA, LTD.
8 VANSCO ROAD, TORONTO 14, ONTARIO

CIRCUIT INTERRUPTION

"Our *Tiger Brand*



NOTICE THE CABLE TRAY fastened to the shovel. This was developed by Universal Atlas for easier cable handling.

TWO WORKMAN WATCH from blast shelter as charge is set off in distance. Low horses cushion cable from shock of falling rock.

HERE A CABLE is raised on horses to clear the railroad track. It feeds the shovel visible in background.

Amerclad lasted 12 years"

Says Chief Electrician, Hudson Plant
Universal Atlas Cement Company

Year after year, at this quarry, the Amerclad is exposed to knife-sharp fragments of flying rock. During the summer, the rock often gets so hot that you can't even touch it. Other times, the cable lies out in the rain and snow—often at sub-zero temperatures.

At the Hudson, N. Y. quarry of Universal Atlas, Chief Electrician Frank Rodmond said, "This Amerclad runs the constant danger of being hit with flying rock fragments through secondary blasting. Yet the down-time cost of this operation is so high that we just can't stand cables that keep failing. We kept that last batch of Amerclad 12 years before we replaced it, yet it was still serviceable when we switched over to new Amerclad."

If you want service like this, specify Amerclad the next time you need cable that can really take it. Amerclad is available in a great many sizes and constructions, with or without shielding. There is a type to power anything from a river dredge or mine locomotive down to a rough and tumble electric hand drill. *Send the coupon,* and get more information.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

THIS IS A TYPICAL DRILL. It uses a 4-conductor No. 8 Amerclad cable.

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB!

paper & varnished cambric cable
asbestos wire and cable
aerial, underground & submarine cable
mold cured portable cord
machine tool & building wire
special purpose wire & cable
shovel & dredge cable

—SEND THE COUPON—

American Steel & Wire Division
Room JE-64, Rockefeller Building
Cleveland 13, Ohio

☐ Please give me more information about Amerclad.
☐ I'd like to talk to your representative.

Name .....
Firm .....
Address .....
City ..... State.....

U·S·S Tiger Brand ELECTRICAL WIRE & CABLE

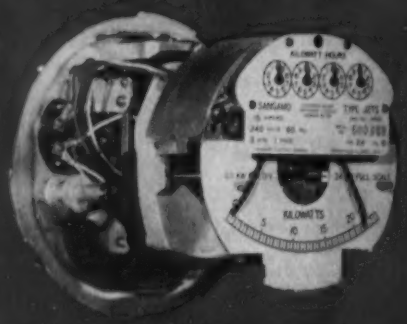
USS

UNITED STATES STEEL

SANGAMO

Safeguards Performance with NATVAR 400

Sangamo Type NIA-25 Current Transformers are designed for indoor service on metering applications. They are wound type with single primary and single secondary, and meet A.S.A. 25 KV insulation class test requirements—15 KV at 60 cycles and 45 KV full wave impulse. Natvar 400 Extruded Vinyl Tape is used because of high insulation value, resistance to heat and ability to form itself to the shape of parts being insulated.



Sangamo Single phase combination Watthour and Demand Meters like the Type J2TS illustrated are built and tested for sustained accuracy under varying temperatures, ease of calibration and repair, resistance to corrosive atmosphere, and ample capacity to measure heavy loads. Natvar 400 Extruded Vinyl Tubing is used for insulation because it meets the requirements with plenty to spare.

Sangamo is one of the most respected names in the electrical industry. For more than fifty years Sangamo meters have measured electricity with great accuracy, have required little maintenance, and have been easy to test and repair. Meters and associated equipment are made in the Sangamo Electric Company plant in Springfield, Illinois.

They safeguard performance through good design for each requirement, individual tests at various stages of manufacture, and careful selection of materials. Natvar 400 Extruded Vinyl Tubing and Tape are used because of their uniformly good electrical and physical properties—particularly the ability to resist heat, oil, corrosive atmosphere and abrasion.

All Natvar flexible insulations are uniformly dependable no matter where or when purchased. They are available either from your wholesalers' stock or direct from our own.

Natvar

Natvar Products

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- Varnished canvas and duck
- Varnished silk and special rayon
- Varnished—Silicone coated Fiberglas
- Varnished papers—rope and kraft
- Slot cell combinations, Abeglas®
- Varnished-lacquered tubing and sleeving
- Extruded vinyl tubing and tape
- Styroflex® flexible polystyrene tape
- Extruded identification markers

Ask for Catalog No. 22

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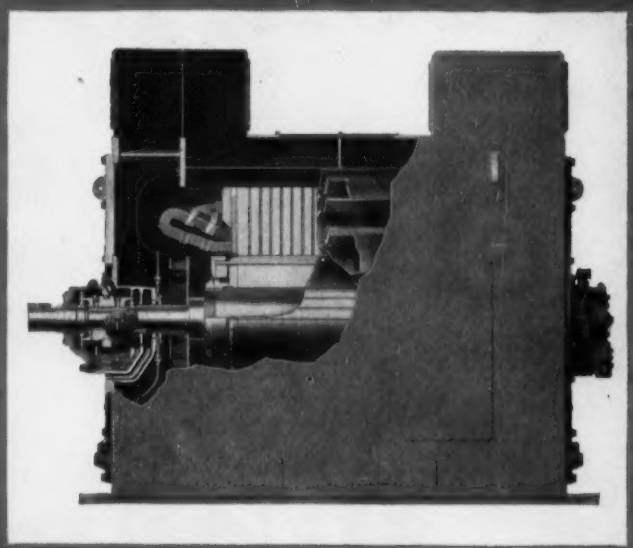
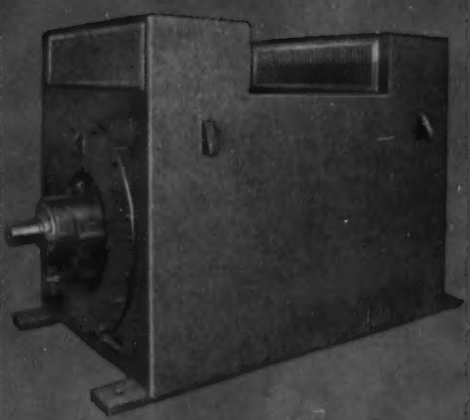
Redesigned

INSIDE AND OUT





ALLIS-CHALMERS Boiler-Feed Pump MOTORS

New features improve 2-pole motors long known for reliability and low maintenance.

New ventilating arrangement features top air intake and discharge *plus* spiral stator core ventilation. Top intakes (available with filters) keep motor clean and make motor room cleaning easy; top discharge adds to personnel comfort. Spiral ventilation — used in turbine generators — assures even internal cooling . . . combines with centrifugal fans and baffled air passages to reduce noise.

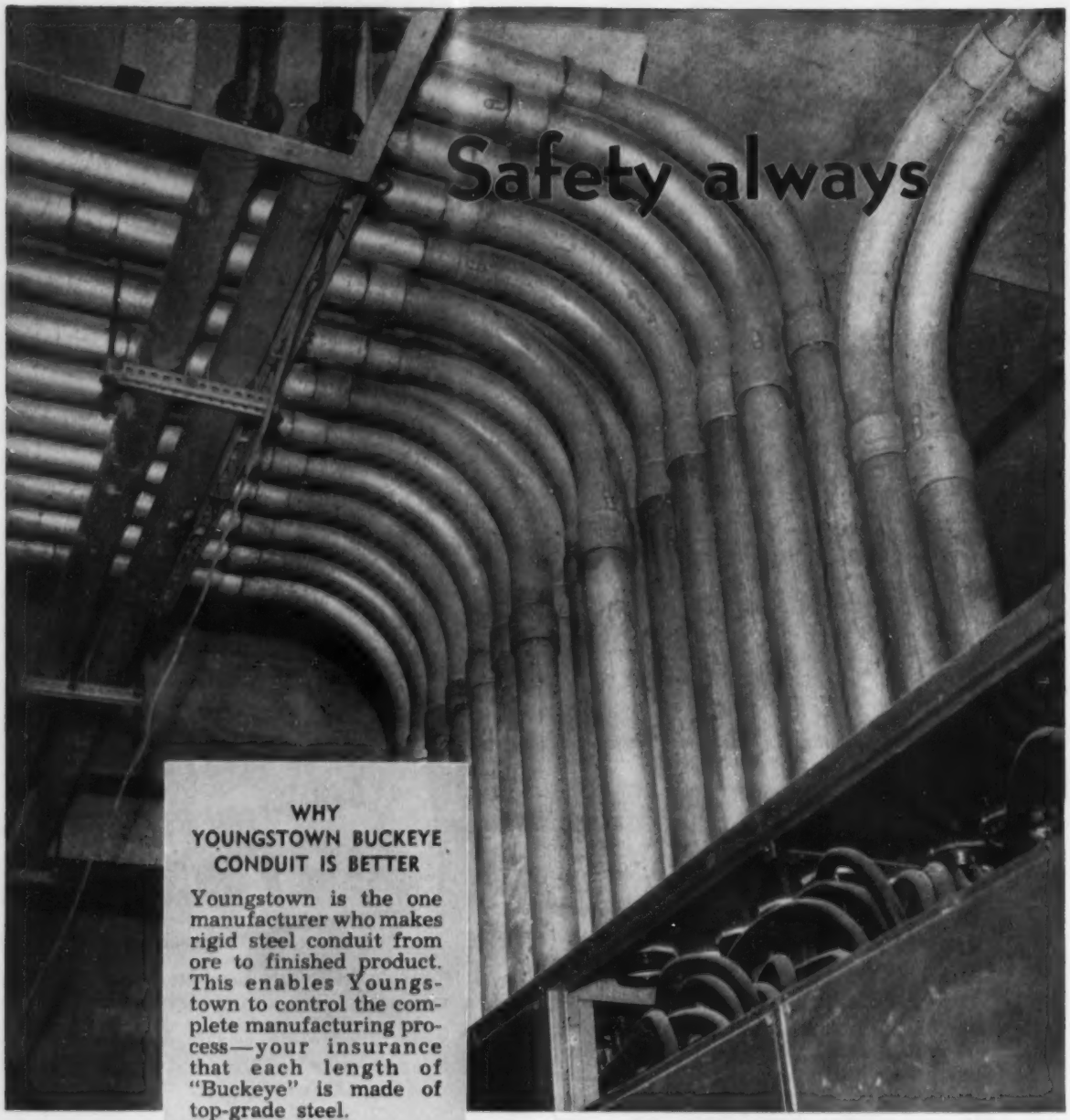
Improved bearing design simplifies maintenance, prevents oil leakage. Capsule-type housings — proved in use on other designs — permit inspection of windings without exposing bearings. Oil leakage is prevented by a combination of features, including orifice-metered oil flow, weirs to maintain correct oil level, labyrinth seals, breathers, and annular pressure chambers with atmospheric relief.

Clean-cut appearance is gained by providing internal space for stator and auxiliary leads, etc.

Features that helped build the Allis-Chalmers 2-pole motor reputation for reliability are retained in the new design. These include proven stator coil design, ample stator coil end bracing, thermally and mechanically stable cage assembly, separate balancing rings, and oxygen-free dew-drop cage bars.

This design available in ratings 900 hp and larger. Ask your A-C representative for Bulletin 05R8123. Allis-Chalmers, Milwaukee 1, Wisconsin. A-4330

ALLIS-CHALMERS



WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Youngstown

QUALITY YOUNGSTOWN SERVICE

● Rigid steel conduit is the only wiring system approved by The National Electrical Code as moisture-, vapor-, dust- and explosion-proof in hazardous locations. When you install Youngstown Buckeye you can be sure that you meet ALL safety requirements for today as well as tomorrow.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

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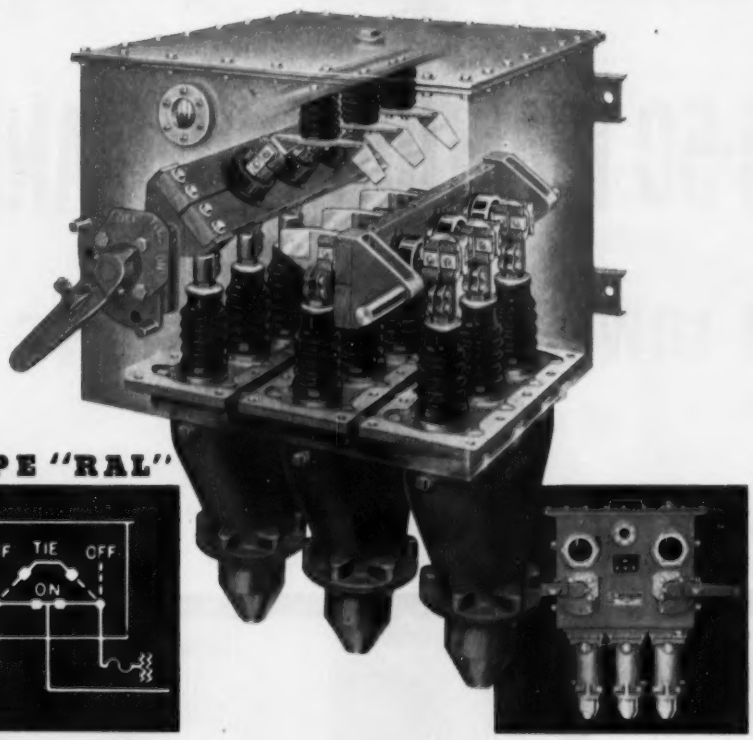
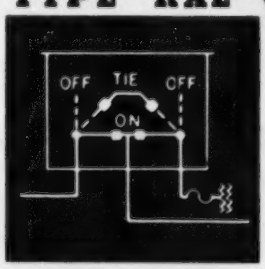
provide safe sectionalization for
cable system flexibility with

G&W
load break oil switches



TYPE "RAL"



Type "RAL" oil switches with three ways (2 feeder and 1 load), two sets of links, and tie buses are designed for use on loop circuits and in other situations where similar flexibility would otherwise require three separate oil switches with correspondingly greater expense for equipment, installation, and space.

These oil switches materially reduce the length of time required for restoring service in case of trouble, or for isolating a circuit to make changes. Load break disconnection of a circuit is accomplished by manually operating an external lever—without opening the tank or breaking the oil and moisture seals.

Bulletin DB51 gives complete data and prices. Write for your copy or ask your representative.

G&W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois
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In Canada—Powerlite Devices, Ltd., Toronto, Montreal & Vancouver.

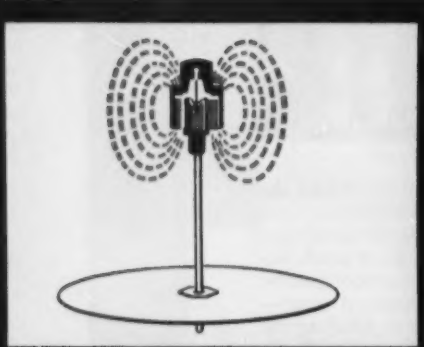
D543

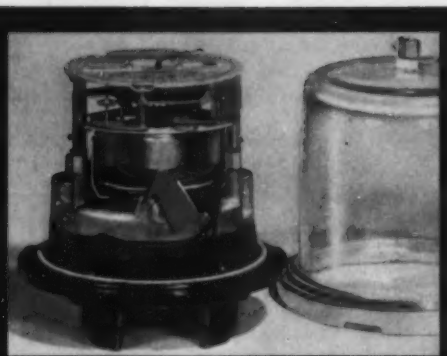
Another member of the I-50 family

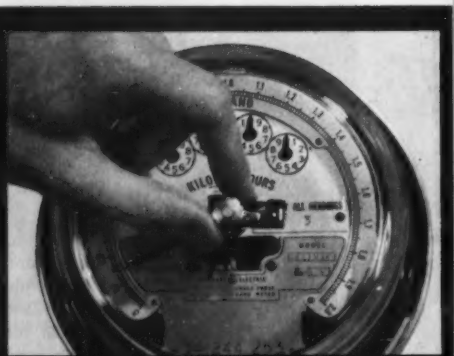
6 REASONS WHY THE

G-E IM-50 WATTHOUR DEMAND METER*

WILL LOWER YOUR METERING COSTS







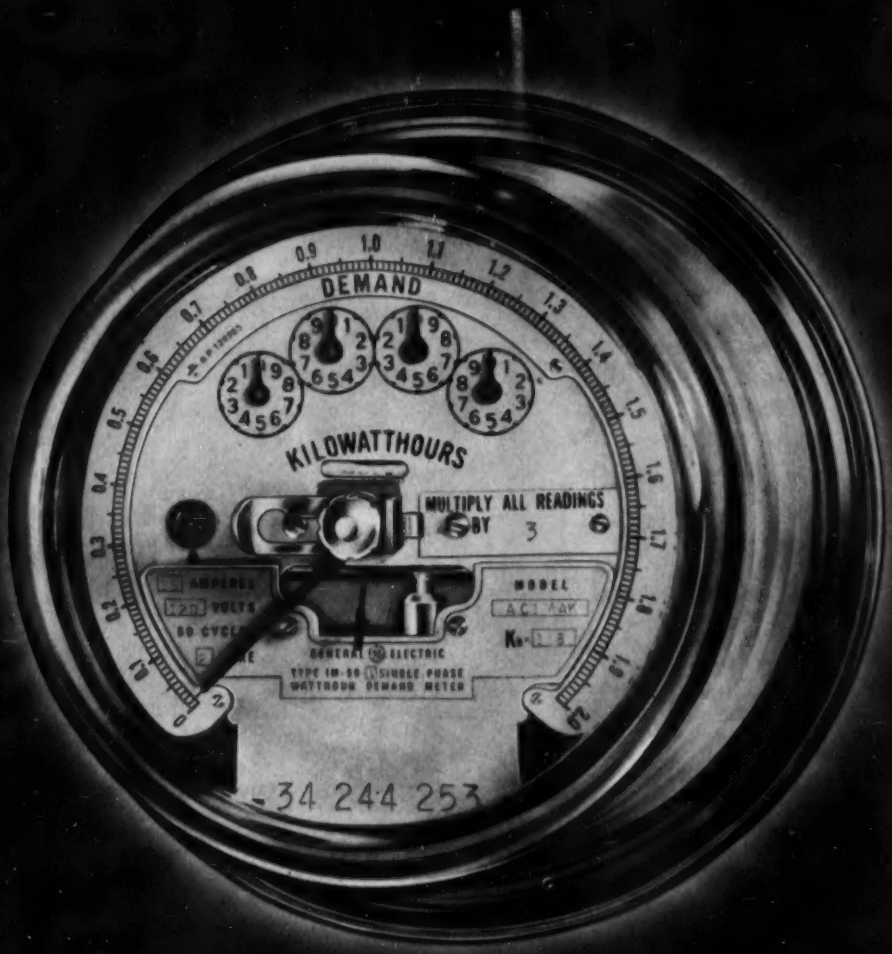
1 **MAGNETIC SUSPENSION SYSTEM** eliminates bearing wear, keeps maintenance costs to minimum; one of many I-50 features in G.E.'s IM-50 meter.

2 **LONG LIFE** of Telechron** motor (arrow) reduces troublesome maintenance problems and need for replacement; grease-lubrication results in longer life of rotor and unit.

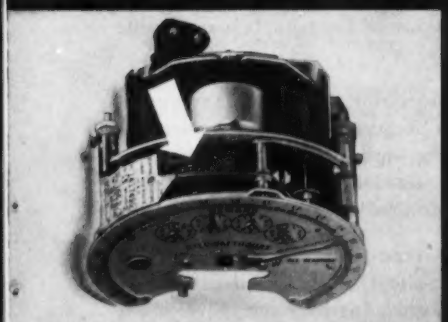
3 **QUICK, EASY RESETTING** is possible with reset mechanism (M-30 register shown). Both indicating and cumulative demand registers are available.

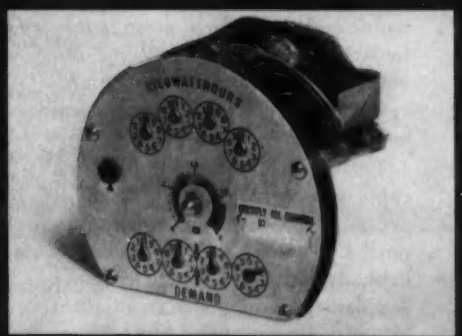
* **IM-50 WATTHOUR DEMAND METERS** are available at 2.5-ampere, 15-ampere, or 50-ampere ratings, for socket or front connections. For a sample demonstration or more information, contact your nearest G-E representative or write Section 601-104, General Electric, Schenectady 5, N. Y.

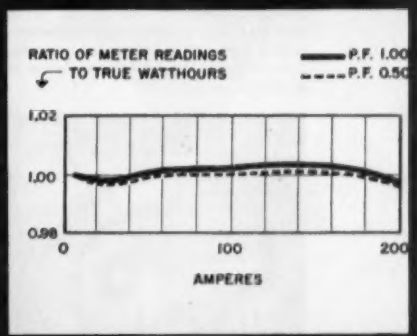
**Reg. Trade-mark of General Electric Company.



ANOTHER MEMBER of the General Electric I-50 family, the IM-50 watthour demand meter combines moderate price with low installation cost for measuring demand on small commercial and industrial loads. The IM-50 offers high accuracy comparable to the 15-amp I-50.







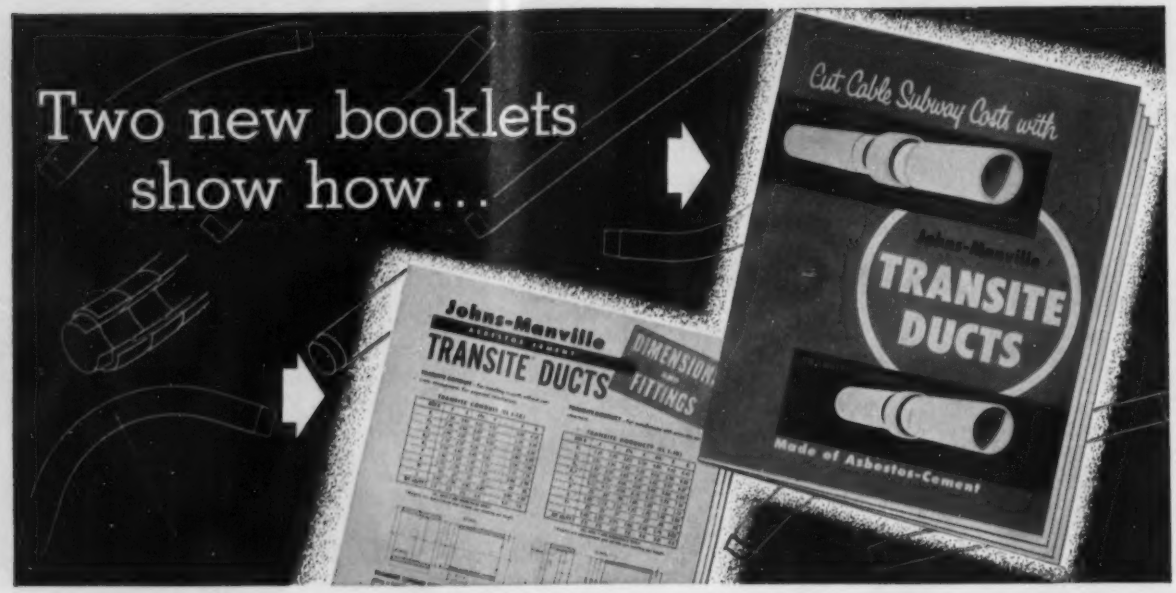
4 **M-30 INDICATING REGISTER** offers greatest flexibility for indicating demand measurements; Geneva action (arrow) assures positive reset.

5 **M-31 CUMULATIVE REGISTER** indicates maximum demand plus cumulative value of previous demand; the monthly resetting feature provides accurate, time-saving settings.

6 **NEW 50-AMPERE RATING** extends straight-line accuracy up to 200 amperes, thus increases dependability of meter on small and large loads.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



Transite® Ducts cut cable subway costs—

give greater cable protection

Transite Conduit is the thicker walled duct which is used for exposed work or is laid directly in earth without a concrete encasement. Saves time, labor and materials on the job

Transite Korduct® is the thinner walled duct for installation in concrete. Inasmuch as it is used principally for hi-voltage lines, its high thermal conductivity reduces operating losses

● Johns-Manville presents these brochures as a service to public utilities, design engineers, and all other users and planners of cable subway systems. "*Transite Ducts*" shows how improved cable subway protection, installation, maintenance and operational savings may be achieved. "*Transite Ducts, Dimensions and Fittings*" give the necessary dimensional data on all ducts and fittings.

Transite Ducts offer improved cable subway protection. Made of asbestos and cement, Transite cannot burn, smoke, fume or generate explosive gases. Transite confines arc damage and protects adjacent cables against heat and flame. Transite resists corrosive action of soils; is unaffected by electrolysis.

Installation savings result because Transite is strong, light in weight, easy to handle. It comes in long, 10-foot sections, thus, fewer joints are required. Its permanently smooth bore prevents injury to cable either from natural movement or when pulling cable through. Maintenance savings result from the permanent nature of the asbestos cement composition of Transite. It is as durable as stone.

Moreover, operational savings result because cables run cooler due to the high thermal conductivity of Transite Ducts. This also results in prolonged cable insulation life.

For complete details on how Transite Ducts can cut cable subway costs for your system, send for copies of "Transite Ducts," EL-29A and "Dimensions and Fittings," EL-45A. Write to Johns-Manville, Box 60, New York 16, New York. In Canada, 199 Bay Street, Toronto 1, Ontario.

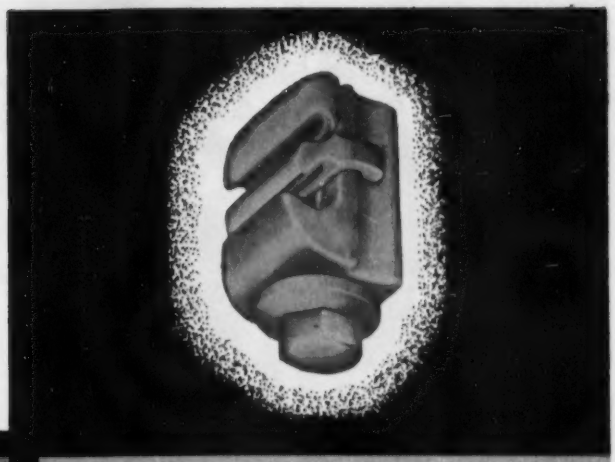
JM PRODUCTS

Johns-Manville TRANSITE DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

A New FARGO Service Connector



Aluminum to Copper

Aluminum to Aluminum

FARGO'S PLATED* ALUMINUM SERVICE CONNECTOR for "All-Purpose" use

Fargo announces a new, plated, aluminum bodied Service Connector for "all-purpose" use. New design features were incorporated in this connector in keeping with the latest advances in aluminum connector research.

The connectors are made with quality controlled aluminum castings having excellent current carrying capacity. The service connector is chemically cleaned and rapidly handled while wet in the plating process so that the inherent high contact resistance of aluminum is eliminated and replaced with the low contact resistance of the plated surface. The plating of the connector also makes it unnecessary to clean the jaws before installation in the field and allows copper conductors to be used in either groove.

The Service Connector is massive with wide jaws for large areas of contact, minimizing distortion and cold flow of the aluminum conductor. Each conductor strand is brought under a pressure area, giving an even distribution of current through the conductor at the joint. More than adequate conductor separation is obtained with a soft, thick aluminum spacer pad which forms around the strands, reducing galvanic corrosion on transfer surfaces. Larger comparative mass and greater radiating surfaces of the connector results in better heat dissipation under normal and fault currents.

Fargo's "one-piece" plated aluminum Service Connectors have a wide range from a minimum of two #8 sol. to a maximum of two #4 ACSR or any combination within these sizes. One connector replaces several sizes formerly necessary.

Other Fargo plated aluminum connectors are available up to 397,500 ACSR.

*Standard plating is tin - zinc alloy.

Patented

Ask your Line Material Field Engineer for complete details.

FARGO

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LM®

CROUSE-HINDS rigid quality control *assures long-lasting products ...* CONDULET* records prove it!

Making a tensile strength test of a Feraloy bar in the Mechanical Laboratory. Constant testing insures uniform quality.

A hydrostatic test of a Type EPC explosion-proof Condulet. It must withstand a pressure 4 times as great as an internal explosion.

Guaging the threads of an Obround Condulet in the factory. Crouse-Hinds quality control follows through to the finished product.

The first CONDULETS, introduced by Crouse-Hinds in 1905, were so well designed and so carefully manufactured that many of the early installations are still in use.... still giving dependable service after more than forty years. This record proves that where quality counts, you can count on CONDULETS!

Crouse-Hinds high standard of quality has always been controlled by careful checking and testing of both raw materials and the finished product. The CONDULET line has expanded from a few items to more than 15,000 types and sizes and the testing laboratories have kept pace with this development. They contain the latest and most modern testing equipment.

Laboratory testing is only part of Crouse-Hinds system of rigid quality control. Factory inspection is equally important. Together, they assure a superior product that will serve you better . . . and last longer!

Always specify CONDULETS.

***CONDULETS are made only by CROUSE-HINDS**

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Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

Type LB Obround Condulet

Type EVA Explosion-Proof Lighting Fixture

Type GUAC Explosion-Proof Junction Condulet

Type ARE Plug Receptacle

Type FSC Tumbler Switch Condulet

CONDULET
First in the field
STANDARD OF QUALITY

A Nationwide Distribution Through Electrical Distributors

AIRPORT LIGHTING · FLOODLIGHTS · CONDULETS · TRAFFIC SIGNALS

Simplify those HARD-TO-HANDLE installations with U. S. GRIZZLY Pre-assembled Aerial Cables

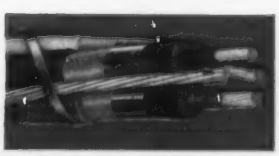
Check the following advantages of U.S. Grizzly® Pre-assembled aerial cables over ordinary open-wiring installations.

1. Less tree trimming is required, and therefore is less objectionable to the community. Can usually be installed in a more direct route.

2. Longer spans and fewer poles due to messenger's great strength.

3. Better appearance because of the elimination of cross-arms and less congestion at the poles.

4. Better service continuity because of high strength supporting messenger.



U. S. Grizzly pre-assembled aerial cable, 15,000 volts. Type RR —3 conductor, Uskorona® ozone-resistant insulation — shielded — Neoprene jacket.

5. Better voltage regulation because the conductors are bound closer together.

6. Lower installation and maintenance costs.

7. Permits shorter poles.

8. Made by United States Rubber Company, specialists in electrical insulation, the only electrical wire and cable producer to grow its own natural rubber, make its own synthetic rubber and manufacture its own plastics.

For more information, write to address below.

FREE BOOKLET

Write for your copy of free booklet giving full information about U. S. Electrical Wires and Cables for the Electric Utility Industry.

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Insist on examining the actual fixtures yourself. Handle them personally. Compare them. *Feel* the difference in quality and value. You needn't be a lighting expert. A good fixture tells its own convincing story. A poor one quickly reveals its flaws.

We hope you will consider Day-Brite's PLEXOLINE or others in the complete Day-Brite line for your lighting needs. We know Day-Brite fixtures give you more for your money. The important thing is for *you* to know. We urge you to *feel* the difference before you buy.

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

THE DAY-BRITE PLEXOLINE®

More than just a fixture, PLEXOLINE is a complete lighting system. Many patterns are possible, including circles, acute and obtuse angles. Conventional runs and single units. For stores, offices, schools, hospitals. Available in Slimline and Rapid Start Fluorescent. Write today for informative literature.

"DECIDEDLY BETTER"
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Lighting Fixtures

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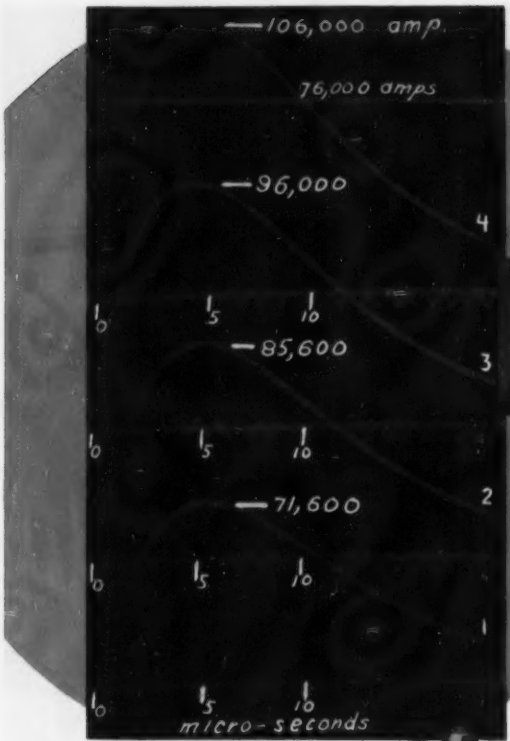


Oscillogram above shows a typical high surge design test. Note that the arrester withstood four surges from 71.6 KA to 106 KA.

Specify Protection by AUTOGAPS

Here's Why!

They Have Extra High Surge Capacity

Surge capacity of a Lightning Arrester relates principally to its thermal capacity and the mechanical strength of its assembly. The exclusive *twin vents* of Hubbard Autogaps offer effective relief for the gases resulting from the most extreme surges, while extra heavy steel reinforcing and fastenings provide the necessary mechanical strength.

The benefits of these characteristics are first; greater protection from extreme direct strokes, and second; long life due to the fact that there is no resistance to be depreciated by absorption of surge energy.

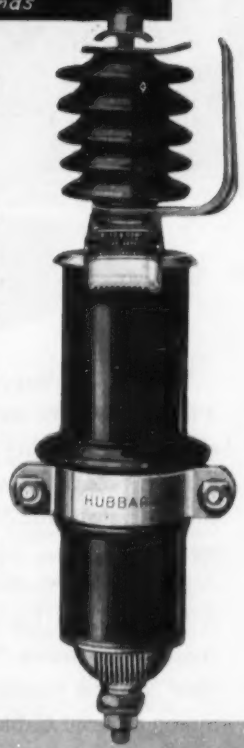
PLUS—Low Impulse Sparkover and Discharge Voltage

For example: Critical sparkover 9 KV arrester = 45 KV; 9 KV arrester discharge voltage during 65 KA surge = 2 KV.

Low impulse sparkover combined with low discharge voltage provides adequate protection for all transformers, whether OLD or new.

Available for all conditions

- Standard arresters for all distribution voltages.
- Arresters available with most self-protected type transformers . . . Specify Autogap.
- Arresters with completely insulated terminals.
- Compact fuse cutout combinations provide cost savings in initial equipment and installation.
- Special arresters for contaminated atmospheres.
- Mounting brackets available for pole, crossarm, steel structures, and new and old style transformers.



HUBBARD AND COMPANY
ESTABLISHED 1843
OAKLAND, CALIFORNIA
"Hang the Load on Hubbard Hardware!"

How to Win Friends and Save Money

The fewer your customers' service interruptions, the fewer your trouble calls. The fewer trouble calls, the better your public relations. Self-supporting aerial cables are one of your public relations best friends.

They give you more circuits per pole, and less maintenance. You can install them on existing pole lines and thus lower your installation costs. For your customers, they mean greater safety, more attractive appearance, and fewer service interruptions. Best of all, they let you save money. Lots of it.

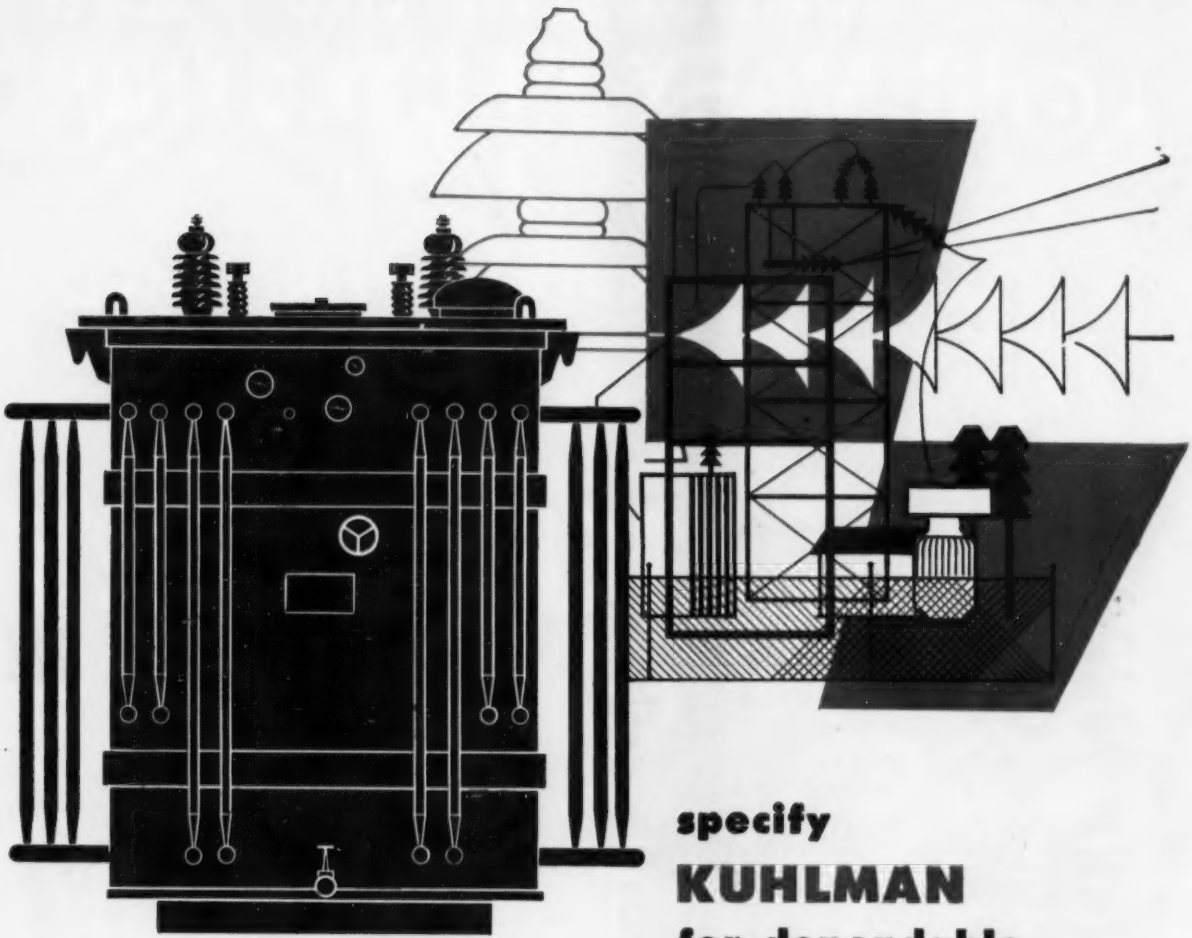
Simplex Self-Supporting Aerial Cables have a tough neoprene jacket that withstands abrasion from swaying tree limbs and chafing against poles. They provide effective protection against fungus, heat, sunlight, and weathering.

If you want to know more about what's in it for you and for your customers, write to the address below for Catalog 1006, or ask your Simplex representative for a copy of the Simplex Aerial Cable Catalog.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE COMPANY

79 Sidney St., Cambridge 39, Massachusetts



specify KUHLMAN for dependable power transformers

For more than half a century, Kuhlman Power Transformers have been providing a steady and dependable source of power for American utilities and industry. Built from finest quality materials and engineered for safe, economical operation, these units incorporate the latest design principles, many of which were developed by Kuhlman. Coils are dried under heat in vacuum to insure uniformly high insulation strength and then impregnated with thermosetting varnish to provide good mechanical strength. Insulation is coordinated to the basic impulse level. Windings are equipped with wide oil ducts for insulation and ample cooling. Oil is introduced under vacuum to prevent entrapment of air and insure high insulation strength. Construction throughout is sturdy and rigid. Structural steel core clamps hold the core securely in place to prevent shifting or vibration and provide support for coil braces, lead guides and terminal structures. Tanks are constructed of heavy steel plate, and sealed to minimize deterioration of oil.

Kuhlman Power Transformers are assembled by men who are highly skilled in the electrical crafts. They are thoroughly inspected and tested to meet rigid quality standards. Kuhlman Power Transformers can be produced in a wide variety of ratings, with accessories to suit the specific needs of utilities and industries. For complete information, write for Bulletin CS-601. Kuhlman also builds Distribution, Dry Type, Saf-T-Kuhl, Subway, CSP and Series Street Lighting Transformers. Bulletins are available on these models as well.

151-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

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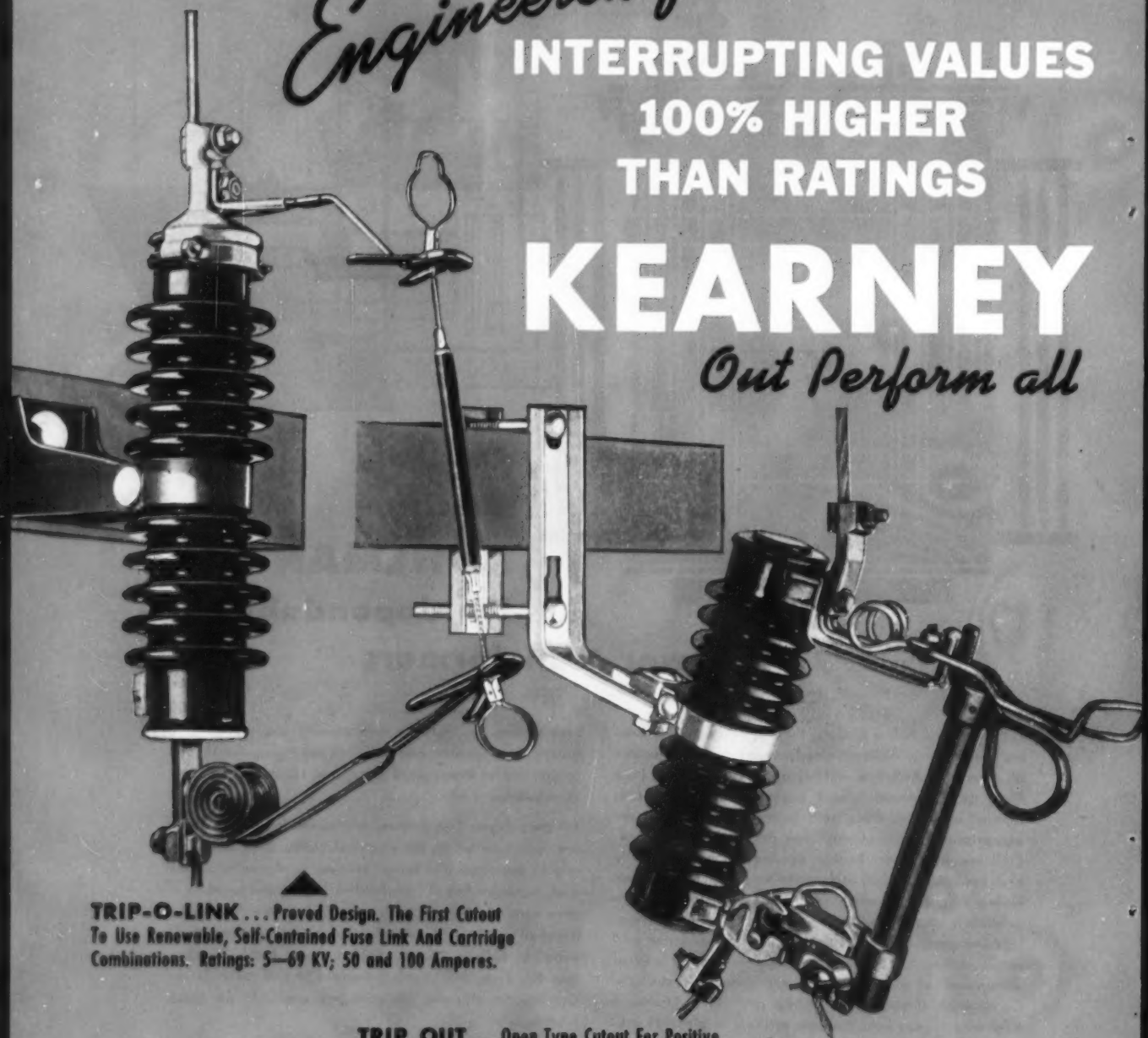
4 Leaders in the Field of PRIMARY PROTECTION

Engineered for

INTERRUPTING VALUES 100% HIGHER THAN RATINGS

KEARNEY

Out Perform all



TRIP-O-LINK . . . Proved Design. The First Cutout To Use Renewable, Self-Contained Fuse Link And Cartridge Combinations. Ratings: 5—69 KV; 50 and 100 Amperes.

TRIP OUT . . . Open Type Cutout For Positive, All-Weather Performance At Sustained, Full-Rated Load. Ratings: 5—69 KV; 100 and 200 Amperes.

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WEST COAST DISTRIBUTORS

Los Angeles • San Francisco • Portland • Seattle • Spokane • Phoenix

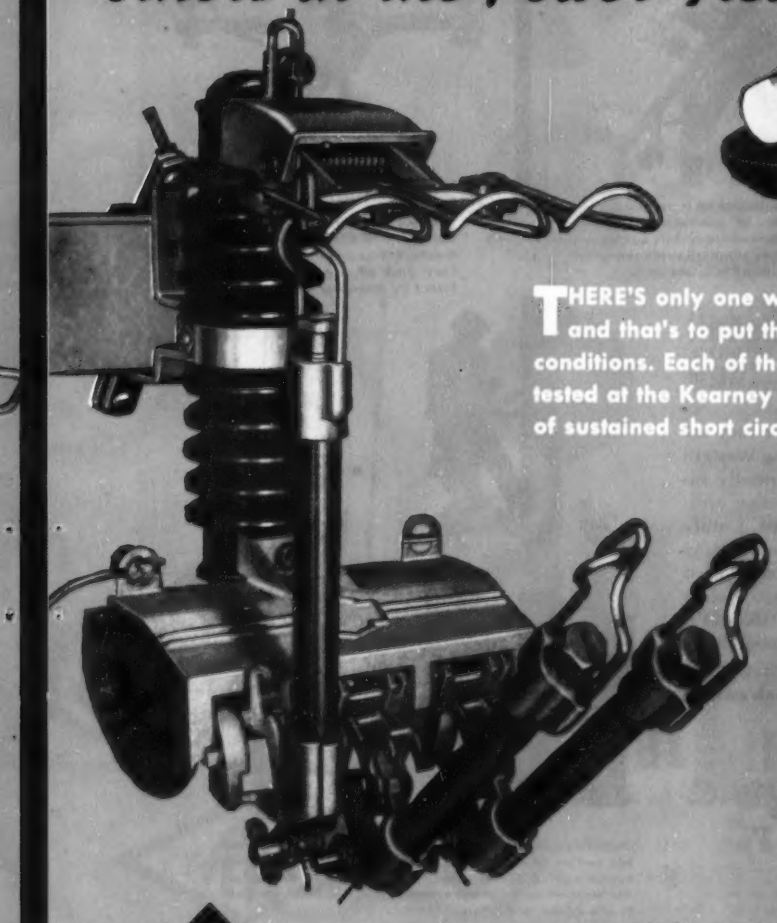
HAVE YOU added substation capacity recently? Chances are you have because load density is growing fast. Then ask yourself this question. Will present fuse cutouts on my distribution system interrupt the heavier fault current? If the nameplates say "KEARNEY" . . . then the answer is "YES."

Feeder outages in 5 years will be even more costly, more damaging than they are now. Kearney field-trained engineers know first hand how important it is to isolate faults; how much they can cost in time, money and customer ill will. That's why Kearney Fuse Cutouts have been designed to clear shorts far heavier than present NEMA standards require. And remember . . . this extra interrupting capacity costs you no more than ordinary cutouts designed for present loads only!

fuse CUTOUTS

others in the Power Field

TRIP O MATIC
Enclosed Type Cutout. Full Range Fault Protection For Urban Systems. Ratings: 5 and 7.5 KV; 50 and 100 Amperes.



TRIPSAVER . . . Three Shot Reclosing Type Cutout. Provides Service Continuity On Troublesome Circuits. Ratings: 7.5—34.5 KV; 100 and 200 Amperes.

THERE'S only one way to check up on field performance . . . and that's to put the cutout into service under exact operating conditions. Each of the 4 fuse cutouts illustrated has been thoroughly tested at the Kearney Sub-Station Laboratory, where 445,000 Kva of sustained short circuit energy are available line to line. Each has proved itself to have the extra interrupting capacity needed to clear increased fault currents.

Then, too, operating records from utilities the country over prove that Kearney cutouts give trouble-free performance in every type of climate, in every type of corrosive atmosphere. At least 15 years of on-the-line service stand behind each of these leaders in primary protection. Take advantage of this proved record.

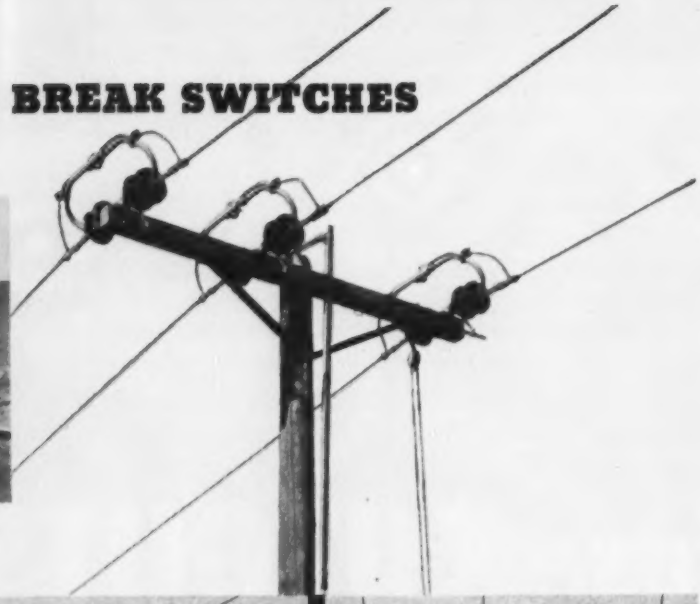
Be ready for tomorrow . . .
Specify Kearney Today!

JAMES R. KEARNEY CORPORATION
4224-42 CLAYTON AVE. • SAINT LOUIS 10, MO.
Canadian Plant: Guelph, Ontario

-832

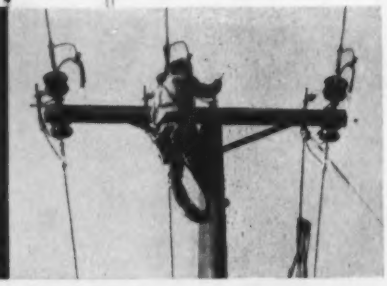
KPF AIR BREAK SWITCHES

1 Sturdy factory-assembled phase units are bolted to cross-arm and push-pull interphase control rods installed on the ground. (Installation is equally simple in the air on installed cross-arms.)



2 At pole top, linemen receive switch bolted to cross-arm and ready to install on pole. Simple design and use of quality materials means KPF phase units are rugged, yet amazingly light weight.

3 Cross-arm bolted to pole, braces and first section of control rod installed. Linemen connect conductors quickly and easily to any standard strain clamp and dead-end direct to phase units.



4 Conductors connected, crank arm being adjusted on push-pull interphase control rod. Like KPF switches and Quick-Breaks, KPF controls need no lubricating. They crack off any icing, are never affected by cross-arm warpage.

Time-tested KPF switches install simply, easily—in 1/2 normal time

KPF switches—the switches that look different because they *are* different—install differently, too. Experience of leading Western power companies shows that KPF switches are normally installed in ½ the time required for complex, cumbersome ordinary equipment. Each KPF phase unit is light weight, readily handled by one man. No extra cross-arms or special supporting structures are needed. Each phase unit is fully assembled, tested and adjusted at the factory. The unit is ready to operate when it reaches the job—no waste of lineman's time. Dependable KPF switches may be mounted horizontally, vertically or triangularly with equal success and long-term, trouble-free service.

For the world's simplest, surest, lowest cost air break switch, specify KPF—standard for nearly 50 years.

5 Installation complete. Lineman installs operating lever and last section of control rod. Note the neat, clean pole top appearance of KPF switches—a familiar sight throughout the West on such famous systems as PG&E, Southern California Edison and others.

KPF
AIR BREAK SWITCHES
Standard for nearly half a century

New catalog gives complete specifications, detail drawings, installation data.

KPF ELECTRIC COMPANY

1624 East Alpine Avenue, Dept. W-4, Stockton 5, California

7987

Varied problems?

BUTT OR LAP JOINTS AT ANY ANGLE

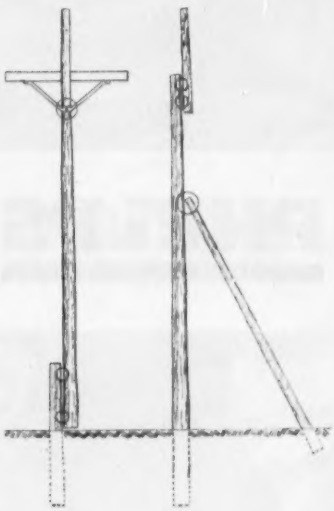
WOOD TO WOOD

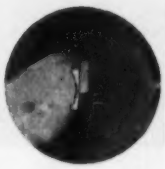
ROUND TO ROUND
ROUND TO DIMENSION
DIMENSION TO DIMENSION

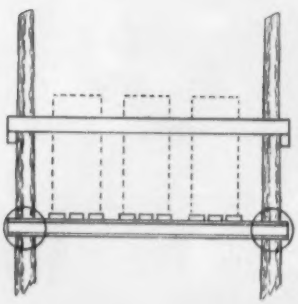
WOOD TO METAL

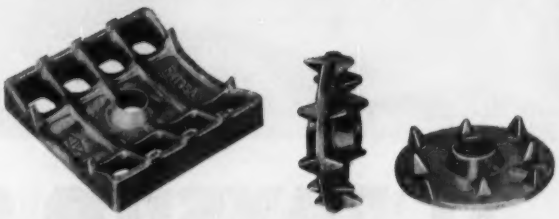
Versatile answer!

M.I.F. GRID GAINS and TIMBER CONNECTORS









M.I.F. Grid Gains and Timber Connectors are adaptable to dozens of different applications — they make STRONGER, MORE DEPENDABLE CONNECTIONS.

Tests show that shear forces four to five times greater than could be resisted by a single through bolt are attained by using Grid Gains or Timber Connectors.

M.I.F. Grid Gains and Timber Connectors permit fuller utilization of the strength of wood by allowing higher design loads in shear — for both permanent and emergency construction. No special tools required for installation.

We have the story for you in our Bulletin PH10. Write us.

MALLEABLE IRON FITTINGS CO.

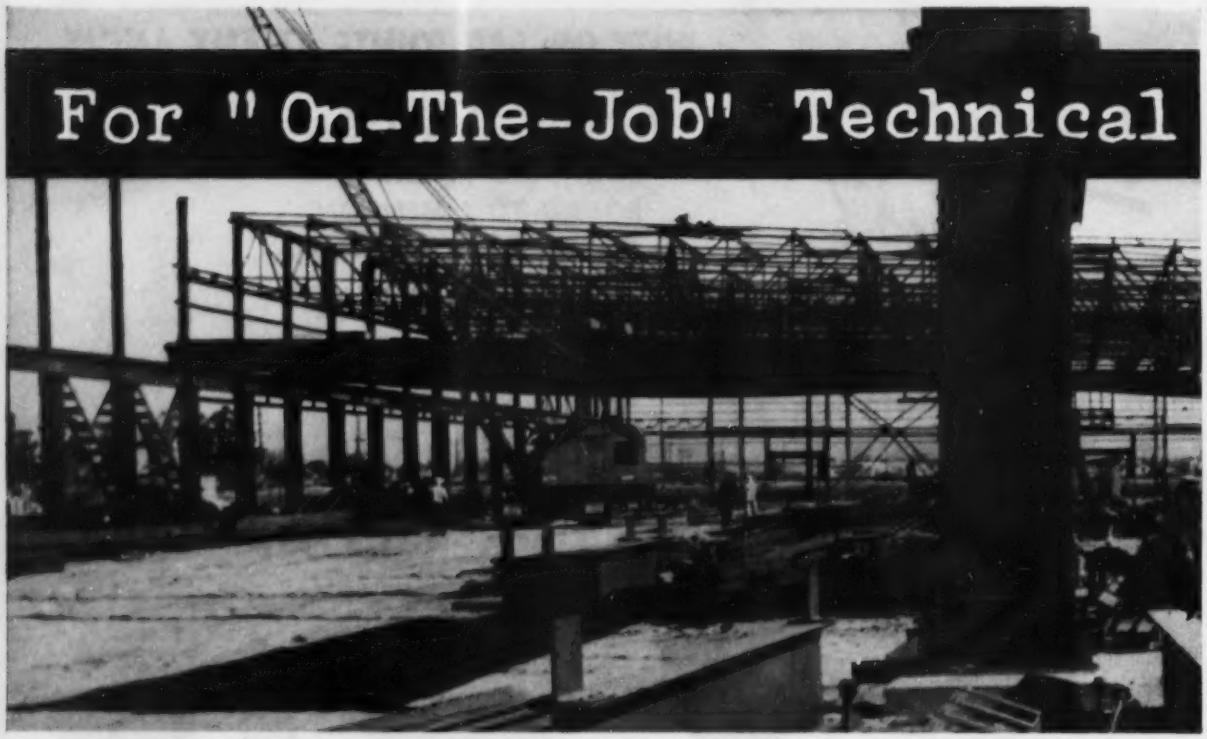
Pole Hardware Division **Branford, Connecticut**

N. Y. Office: 30 Church St.

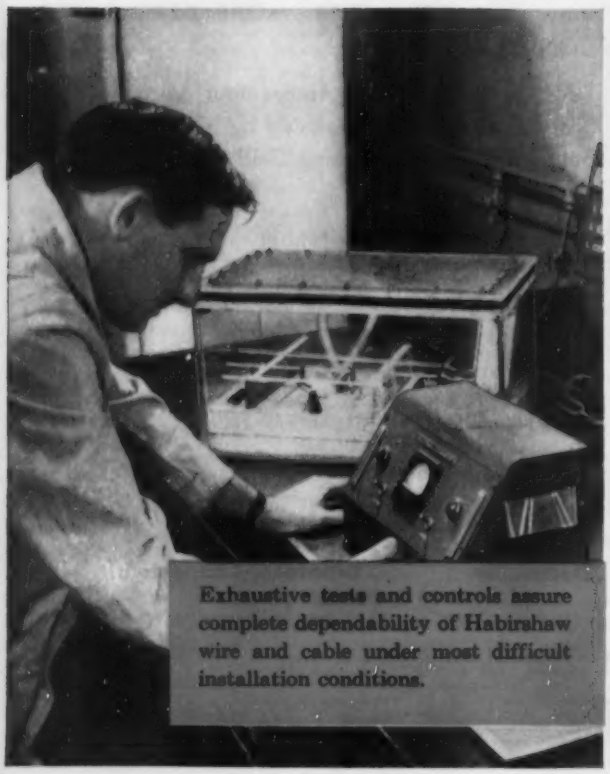
Canadian Mfr. & Dist.: LINE & CABLE ACCESSORIES, Ltd. TORONTO

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill. • B. H. McCoin, Knoxville, Tenn. • E. A. Thornwell, Inc., Atlanta, Georgia • J. F. Voight, Summerville, S. C. • Waltham, DeWitt & Krusi, San Francisco, Calif. • L. G. Wendegatz, Kansas City, Mo. • Williams Sales Co., Fort Myers, Fla. • Williamson Sales Co., Shreveport, La. • O. C. Witte Co., Detroit, Mich.

1854 ★ ONE HUNDRED YEARS ★ 1954

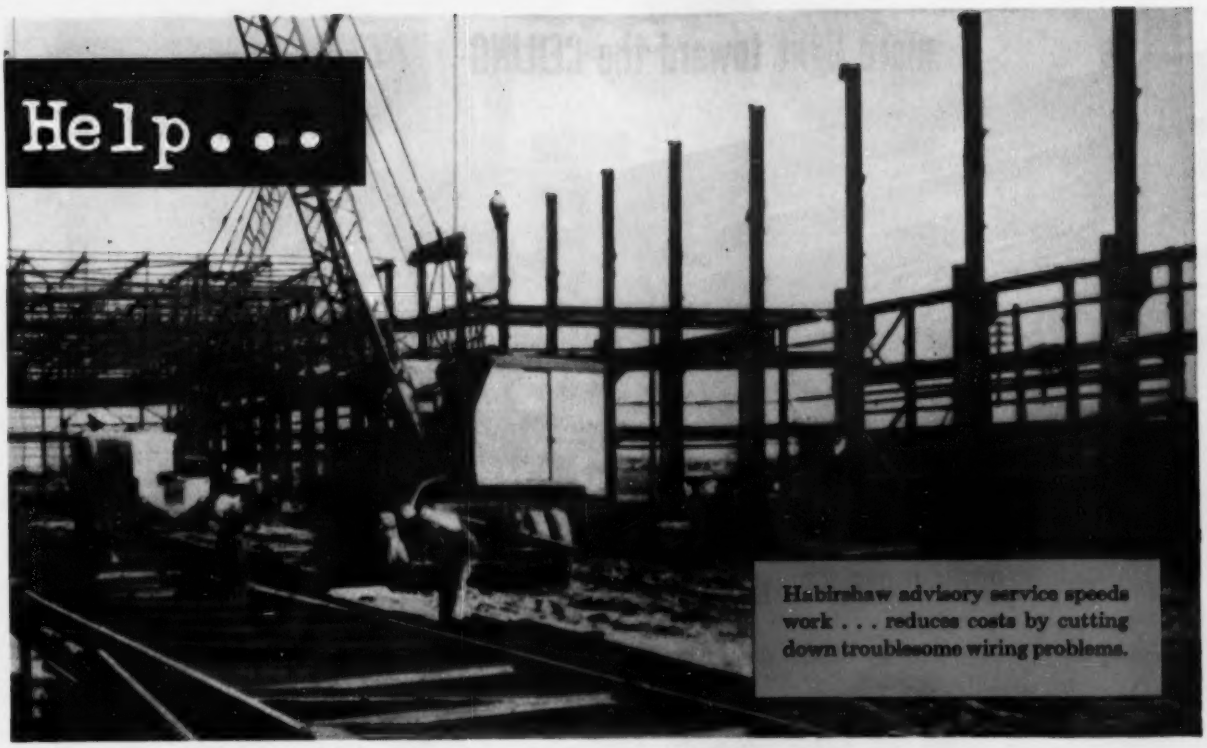


IT PAYS TO SEE A PHELPS



Exhaustive tests and controls assure complete dependability of Habirshaw wire and cable under most difficult installation conditions.

Phelps Dodge engineers are available to assist distributors and their customers in solving all kinds of difficult wiring problems.



DODGE DISTRIBUTOR!

Phelps Dodge Distributor Service Helps Facilitate Job Planning, Minimize Job Problems

Specifying Habirshaw wire and cable, made by Phelps Dodge Copper Products Corporation, assures you of two highly important advantages: (1) top quality cable—the finest in materials and workmanship, and (2) expert advice from Phelps Dodge's experienced engineering staff. These are two major reasons why it will pay you to rely on Phelps Dodge!

PHELPS DODGE COPPER PRODUCTS CORPORATION

WIRE BY PHELPS DODGE MEANS WIRED FOR LIFE!

more light toward the CEILING

means more seeing comfort BELOW!

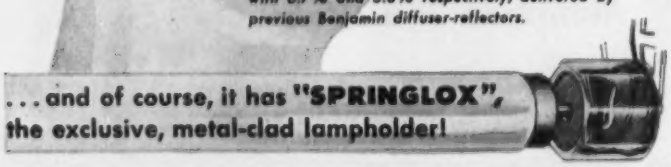
• • • new Benjamin Diffuser-Reflector now delivers almost TWICE THE UPWARD LIGHT!

- increases brightness control for greater uniformity of light
- eliminates annoying shadows that distract from work
- reduces contrasts that can cause eye fatigue

This improved, all-porcelain-enamel Benjamin Diffuser Reflector enables you to utilize highest light levels and still enjoy comfortable seeing conditions, without materially reducing lighting efficiency.

A series of 14 apertures, located on the top of the reflector, 7 above each lamp, direct 12.6%* of the light toward the ceiling. This greater upward light helps relieve disturbing contrasts between upper and lower room areas. It wraps the entire room in uniform illumination, so important in reducing eye strain and fatigue caused by excessive brightness contrast. Send for Data Bulletin. Benjamin Electric Mfg. Co., Dept. J, Des Plaines, Ill.

*for 2-lamp units. 10.7% for 3-lamp units. As compared with 6.7% and 5.8% respectively, delivered by previous Benjamin diffuser-reflectors.



...and of course, it has "SPRINGLOX", the exclusive, metal-clad lampholder!

BENJAMIN TRADE MARK

Diffuser-Reflector

Sold exclusively through electrical distributors
available in open-end and closed-end units, for single or bi-pin lamps.
a Product of Benjamin Electric Mfg. Co.
makers of famous Benjamin and Leader Line lighting equipment
and Sound Signals for Industry, Institutions and Commerce.

681-J

ELECTRICAL BOOKS

MAGNETIC FIELDS of CYLINDRICAL and ANNULAR COILS, *by Chester Snow, National Bureau of Standards Applied Mathematics Series 38, 29 pages, 8x10½, Government Printing Office, Washington 25, D. C., 25c.*

Mathematical formulas are developed in terms of complete elliptic integrals or of Legendre functions for the axial and radial components of the magnetic field produced by cylindrical coils carrying an electric current. Cases treated include cylindrical current sheet, circular current sheet and multilayer solenoid.

TEN FOUNDING FATHERS of ELECTRICAL SCIENCE, *by Bern Dibner, 48 pages, 8¼x 10¾, Burndy Library, $1.*

Brief biographies of Gilbert, de Guericke, Franklin, Volta, Ampere, Ohm, Gauss, Faraday, Henry and Maxwell are included in this volume—covering three centuries and five nations. These were chosen from the many equally important experimenters in this field. Portraits of each subject and diagrams of principal experiments illustrate the book.

INTRODUCTION to ELECTRIC FIELDS, a Vector Analysis Approach, *by Walter E. Rogers, 333 pages, 6x9, McGraw-Hill Book Co. Inc., $7.50.*

The purpose of this work is to present Maxwell's equations as a logical summary of some truly analytical experience in solving problems of electric and magnetic fields by vector methods and to provide an introduction to potential theory and boundary-value problems at a level to form a foundation for the concept of vector potential. The book is designed for basic courses in field theory or electromagnetics for junior-senior electrical engineers. Basic concepts are treated in detail and accompanied by physical interpretations. A. D. Moore's fluid-mapping methods are used as illustrations and as an aid to visualization.

APPLIED ELECTRONICS, *second edition, by Truman S. Gray, 881 pages, 6x9, John Wiley & Sons Inc. and Technology Press, $9.*

The aims of this revision have been to improve and clarify details, bring coverage up to date and include new developments, such as the transistor and its application. A discussion of the physical phenomena that form the foundation of electronics is followed by an explanation of the way the phenomena combine to govern characteristics, ratings and limitations of electronic devices. Final chapters provide a treatment of the applications of electronics to branches of electrical engineering. Book is for independent study, or as a reference text by those with a basic knowledge of the subject.

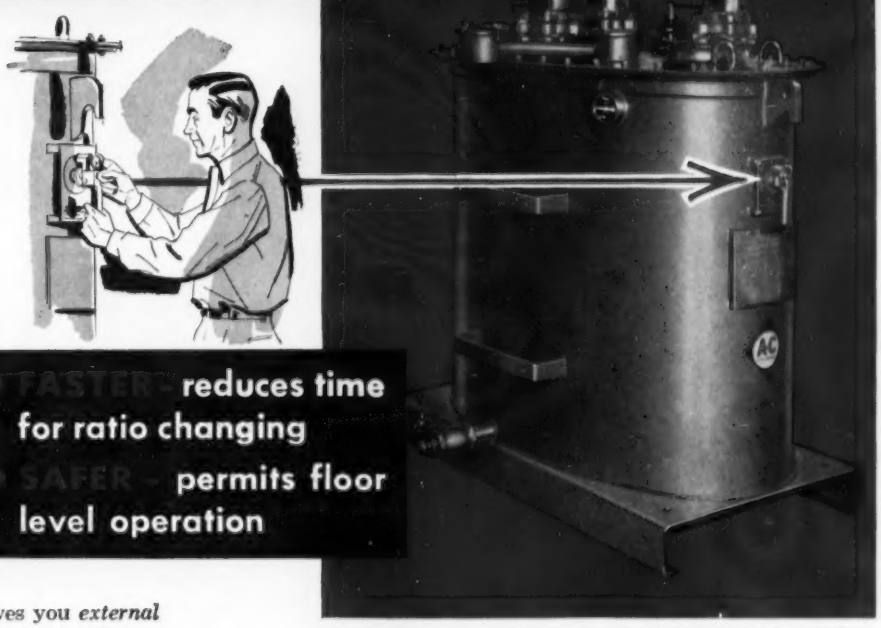
TABLES of INTEGRAL TRANSFORMS, *volume one, Bateman Project Staff, 391 pages, 6x9, McGraw-Hill Book Co., $7.50.*

Prepared as a companion to Higher Transcendental Functions by the same authors, this is the first of two volumes of tables of integrals involving higher transcendental functions and is designed for use of mathematicians, scientists and engineers. This book contains tables of Fourier transforms, of LaPlace transforms and inverse LaPlace transforms, and Mellin transforms and inverse transforms.

Now—

External Ratio Changing For Metering Outfits

ALLIS-CHALMERS Instrument Transformers



• FASTER — reduces time for ratio changing
• SAFER — permits floor level operation

External ratio changing is now standard on Allis-Chalmers metering outfits for current ratings up through 200/400 amp, 25 kv through 69 kv. Consult factory for ratio changer on 15-kv metering outfits.

NOW Allis-Chalmers gives you *external* ratio changing on metering outfits. A real convenience — just de-energize the circuit and rotate the handle. All phases are changed simultaneously. The ratio changer used is the same rugged "point contact" mechanism already proved in service on Allis-Chalmers power transformers.

Ratio Changer Features

Contacts are self-aligning. Contact pressure is equal and positive; it is increased as a result of magnetic forces. A single current path is established by round point contact under high unit pressure against a flat stationary contact. Strong wiping action cleans surfaces for good contact.

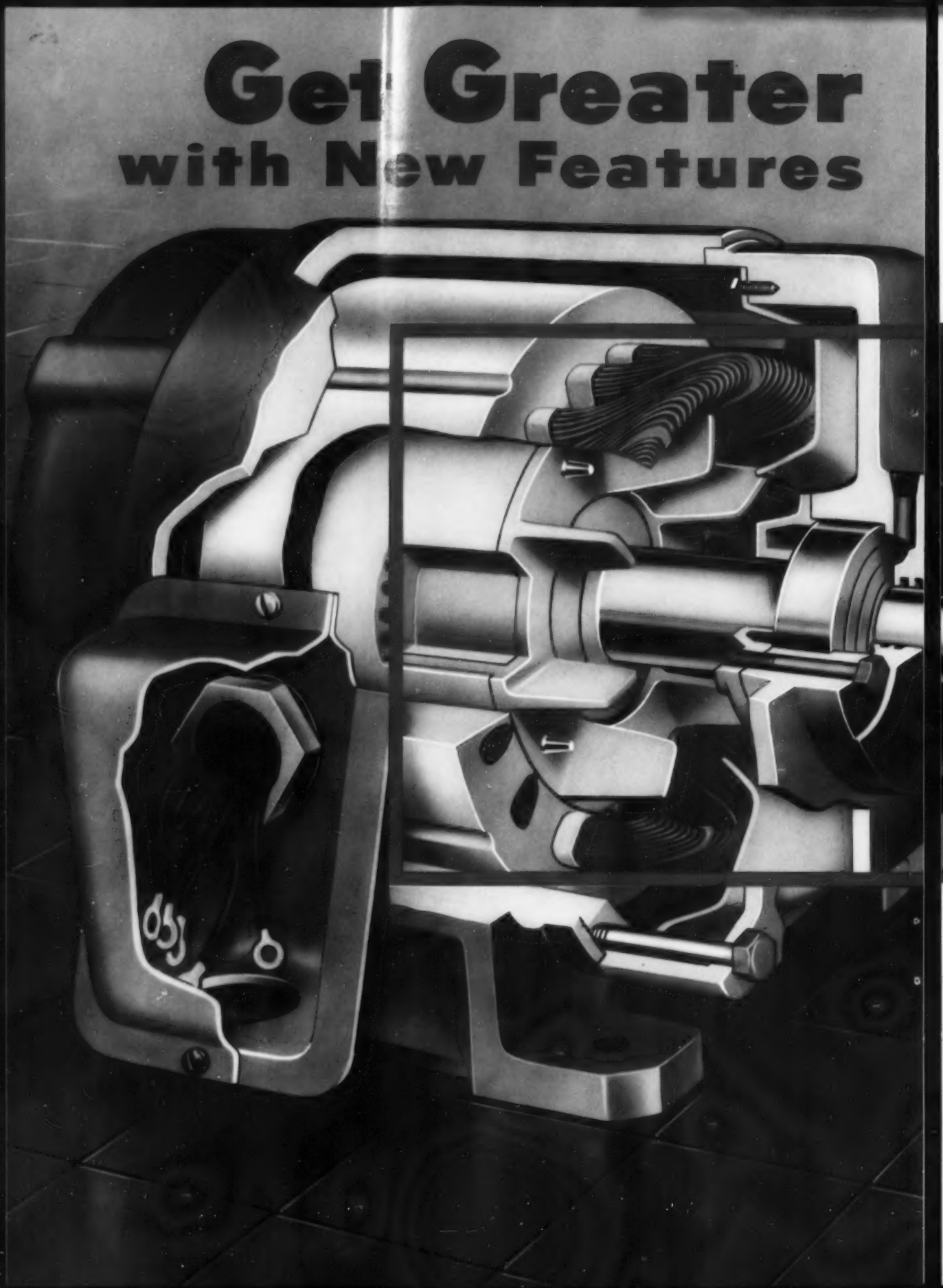
Get Complete Information

Find out how Allis-Chalmers metering outfits with *external* ratio changing for de-energized operation give you faster, safer, simpler operation. Call the A-C office nearest you, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4359

You get high safety factor and sound electrical design in Allis-Chalmers metering outfits. Insulation life is extended because corona is minimized — one more step toward longer service life. All metering outfits are furnished with double current ratings to provide for future load growth.

A-C ALLIS-CHALMERS

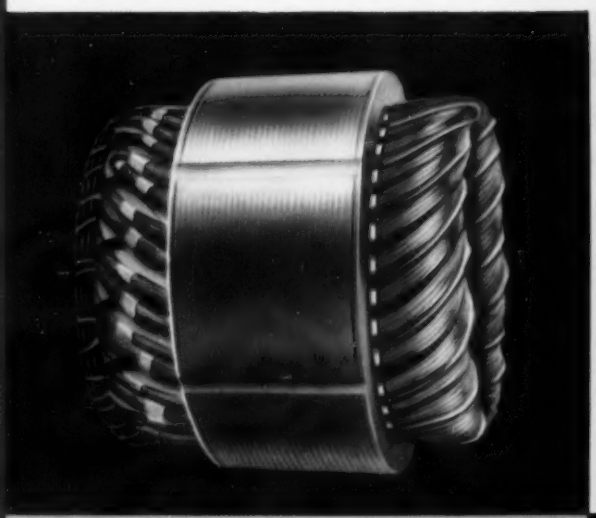

Get Greater
with New Features

Motor Economy
. . . Proved Principles

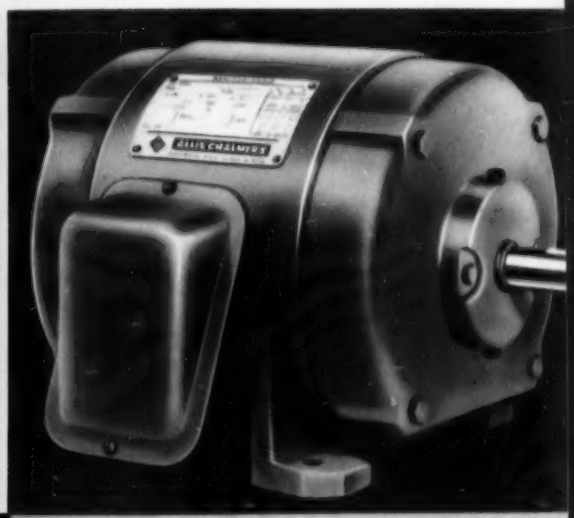
Here's the inside story of a great new motor. It combines the best of the new developments in methods and materials with the best of the tried and proved principles that have made such an outstanding record for Allis-Chalmers motors.

Smaller in size than previous designs, it offers greater protection against damage from falling liquids and solids. The bearing design gives greater bearing protection, ease of maintenance and long life. Insulation gives you famous Allis-Chalmers rugged dependability.

Consult your nearby Allis-Chalmers Authorized Distributor or District Office on your motor needs. Or write for Bulletin 51B6210.



STATOR DOUBLE INSULATED—Stator laminations are welded across back for rigidity. Heavy varnished cambric insulation is inserted between phase windings. Wound stator is dipped several times in special insulating varnish of proved effectiveness and stamina, and baked after each dip. The Allis-Chalmers stator is both physically and electrically strong . . . thoroughly protected against moisture, heat and corrosion.



RIGID CAST-IRON FRAME—Heavy, distortion-free cast-iron frame holds bearings in rigid alignment . . . gives all-around protection against physical damage . . . resists rusting.

Air intakes are well protected by being located on the underside of the end housing. There is plenty of room for free air circulation on the back of the stator core for efficient, even cooling. Air is discharged horizontally and to the sides.

Multiple bearing protection keeps grease in... keeps dirt out...permits relubrication in service

Extreme care has been taken to provide longest possible bearing life and lowest possible maintenance costs. The bearing itself is of double-shielded type, which allows controlled migration of grease in and out of the bearing to suit operating conditions. Yet bearing is protected against greatest cause of bearing trouble — overgreasing.

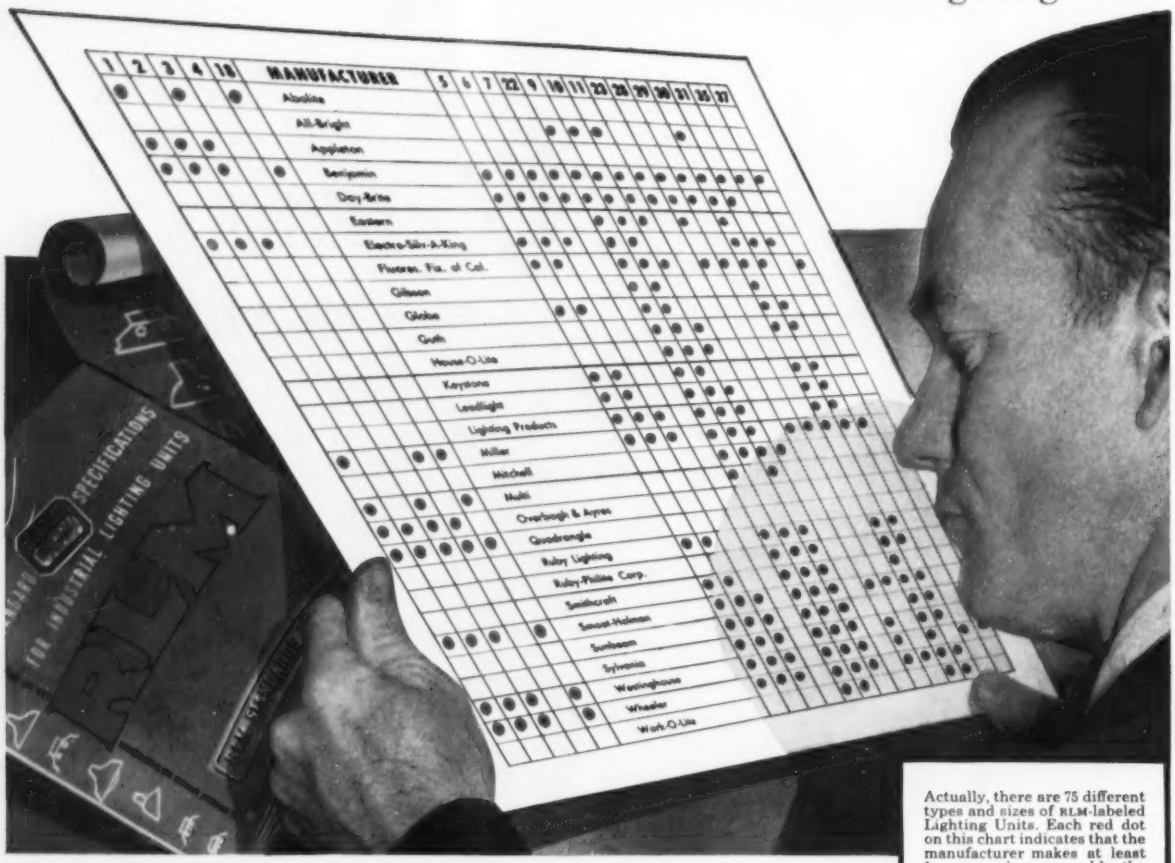
Close running clearances and double labyrinth seals between the shaft and outer bearing housings keep grease in the bearing and exclude dirt. Grease is kept out of the interior of the motor by a bearing cap with a long running clearance along the shaft. The cap is held tightly in place by hex head cap screws. Large grease chambers hold an ample supply of lubricant.

A-4362

ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN

Here are your answers to 2 IMPORTANT QUESTIONS about Industrial Lighting Units



Actually, there are 75 different types and sizes of RLM-labeled Lighting Units. Each red dot on this chart indicates that the manufacturer makes at least 1 or more sizes covered by the particular RLM Specification.

Key to Spec. Nos.:

INCANDESCENT UNITS:

1. Dome (100-1000w)
2. Deep Bowl (100-1000w)
3. Sym. Angle (100-1000w)
4. High Bay (500, 1000w) Porcelain Enameled
18. Glassteel Diffuser (200-1000w)
40. High Bay Aluminum (500, 1000w)

FLUORESCENT UNITS:

Closed-End Reflectors:

5. 2-40w lamps, 48"
6. 3-40w lamps, 48"
7. 2-85w lamps, 60"
22. 2-40w w/shield, 48"

Open-End Reflectors:

9. 2-40w lamps, 48"
10. 3-40w lamps, 48"
11. 2-85w lamps, 60"
23. 2-40w w/shield, 48"
28. 2-58w, 72"
29. 3-58w, 72"
30. 2-75w, 96"
31. 3-75w, 96"

Semi-Direct Units:

35. 2-40w, 48"
36. 2-58w, 72"
37. 2-75w, 96"

Chart as of Jan. 1, 1954

1 WHY are RLM Specifications Important to me?

ANSWER: RLM Specifications furnish you with basic, nationally-accepted minimum standards of efficiency, design, performance and quality in industrial lighting equipment. This latest-edition 52-page RLM Specifications Book puts all 21 RLM Specifications at your fingertips, complete with coefficient of utilization tables and candlepower distribution curves. In addition, there are four pages of reasons why RLM Specifications are important to everyone who buys, sells or specifies industrial lighting equipment. Send for your COMPLIMENTARY COPY of the RLM Specifications Book ... there is no obligation!

2 WHO makes RLM-Labeled Units I want to Specify?

ANSWER: As shown by this chart, which is also included with the RLM Specifications Book, there are 29 different manufacturers who make RLM-labeled lighting equipment. Each RLM Unit must conform to the minimum performance and quality standards required by RLM Specifications. However, every manufacturer is free to incorporate his own special features, construction refinements and operating advancements — such as sockets, control equipment, wiring, etc. Send for your FREE RLM Book for more details. RLM Standards Institute, Suite 815, 326 West Madison Street, Chicago 6, Illinois.

RLM STANDARDS INSTITUTE INCORPORATED

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

MANUFACTURER'S NAME COMPLIANCE WITH RLM STANDARDS ELECTRICAL TESTING LABORATORIES, INC.

R568

Each Spang Representative and his sales personnel throughout the nation now carry this new type conduit display box to present top-quality Spang Conduit.

SPANG® presents

the Case of the Quality Conduit

Here they are . . . Spang's "Big Three" . . . SPANGLEAM EMT, Spang Black and Spang Galvanized (Hot Dipped)! The top-quality conduit designed to help you do a quality job . . . and to give years and years of quality service in every type installation!

Why is Spang so proud of its conduit? Here's why—

QUALITY-MANUFACTURED . . . Only the highest quality steel is selected for Spang Conduit, and it is formed under exact heat conditions with close metallurgical controls rigidly adhered to.

QUALITY-TESTED . . . Spang Conduit is constantly inspected throughout manufacture, and every piece of conduit is *doubly* tested and inspected before delivery.

. . . FOR QUALITY INSTALLATIONS. Spang Conduit is easier to cut, thread, bend and weld, saving you valuable time and money on all your conduit installations.

Take your choice of the "Big Three" . . . Spang Black, Spang Galvanized (Hot Dipped) or SPANGLEAM EMT . . . but be sure to specify Spang. Your Spang Distributor carries the complete Spang Conduit line.

SPANG® CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

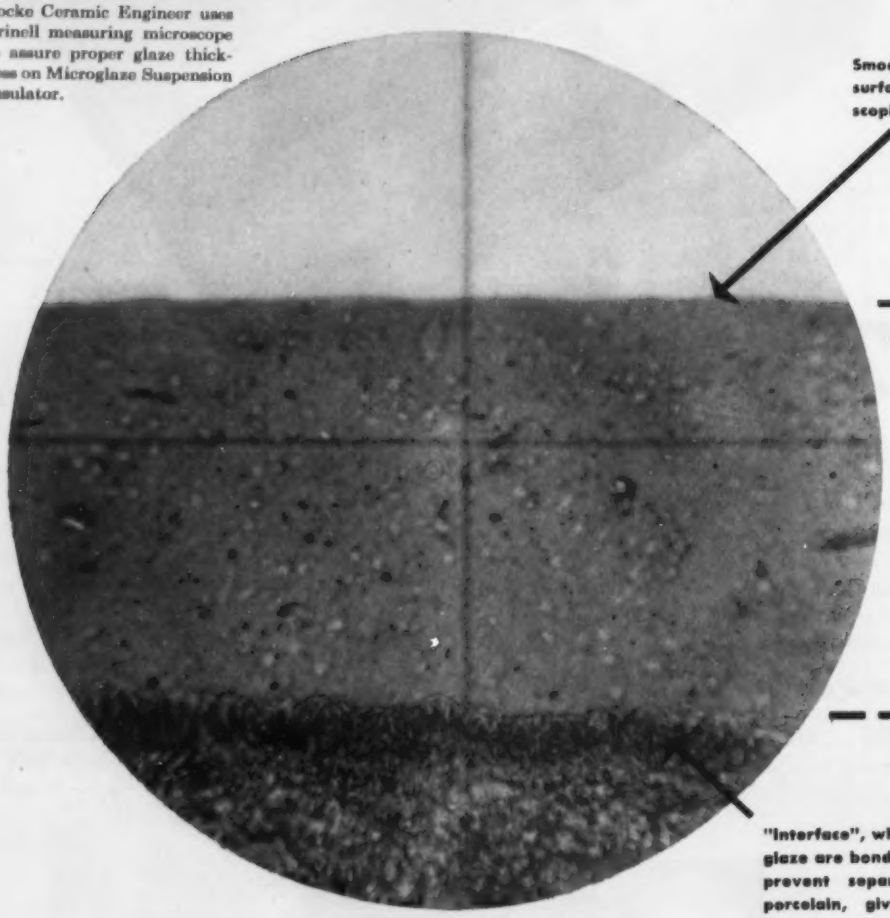
Locke reports new facts about

GLAZE THICKNESS and

Research into their relationship leads Locke to develop . . .

Locke Ceramic Engineer uses Brinell measuring microscope to assure proper glaze thickness on Microglaze Suspension Insulator.

Photomicrograph of cross section near surface of Microglaze Suspension Insulator



Smooth, self-cleaning glaze surface results from microscopic glaze thickness control.

Thickness of glaze, measured between surface and junction with porcelain body is controlled by Locke to achieve peak strength.

"Interface", where porcelain body and glaze are bonded. Interlocking crystals prevent separation of glaze from porcelain, give added strength to Microglaze Insulators.

INSULATOR STRENGTH

NEW MICROGLAZE SUSPENSION INSULATORS

An insulator's ability to withstand mechanical impact varies with thickness of the compression glaze on its surface. Too much glaze . . . or too little . . . will prevent full development of insulator strength.

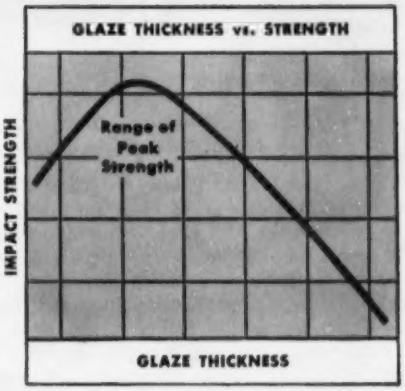
However, laboratory tests show that porcelain with a smooth coat of compression glaze, held within a microscopically narrow range of thickness, will be as much as 40% stronger than improperly glazed porcelain.

Locke has been quick to bring this discovery out of the lab and onto the production line for the benefit of all insulator users.

The result is the new MICROGLAZE Suspension Insulator.

Microscopic control of glaze thickness is now applied to these mass-produced suspension insulators, resulting in uniform peak strength, assuring you a new kind of protection . . . and longer, trouble-free insulator service life.

Next time specify MICROGLAZE Suspension Insulators . . . your best insurance yet against the hazards of mechanical impact.



Research in Locke laboratories proves definite relationship between glaze thickness and both flexural and impact strength of the porcelain. Curve shows how impact strength increases with increasing glaze thickness, reaches peak, then drops sharply. On Microglaze Insulators, glaze thickness is maintained within the narrow range which gives *peak* strength.

Accurate glaze thickness control is accomplished by use of this precision glazing machine. As each insulator spins its way around the wheel, it is cleaned, moistened, glazed, exactly the same way as every other. This, combined with special control of many other factors assures uniform appearance, uniform top strength, uniform reliability.

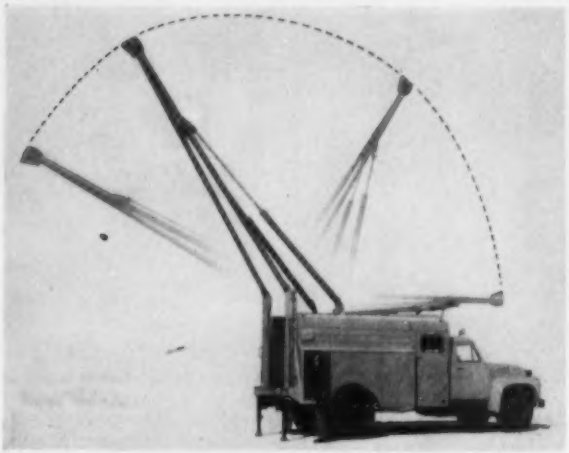
Send today for new 8-page folder titled "The Story of Microglaze Insulators"

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

*Trademark of General Electric Company

PRODUCT NEWS



Hydraulic Derrick

(1) Powers-American Division, McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.

An addition to the Pole-Master line of hydraulic derricks will handle poles up to 75 ft long. Movement is actuated by two pairs of hydraulic cylinders, which are driven by a power take-off installed on the chassis transmission. One pair of cylinders is used for spotting the boom, the second pair for raising or lowering the head sheave 31 in.

Twin positioning cylinders, attached to side legs and body roof, move the boom to any point throughout an arc of nearly 180°. There are no predetermined stops, the manufacturer states. Height adjustment cylinders to which side legs are anchored at rear of body permit the working height to be changed without altering the angle of elevation.

The derrick does not obstruct body load area; has no exposed mechanism; can be used with a single-drum winch. Rated capacity with head sheave fully extended 5 ft to rear of side leg pivot points is 9,000 lb. All movement is controlled by levers. The series HD-4-70 is described in bulletin 407.

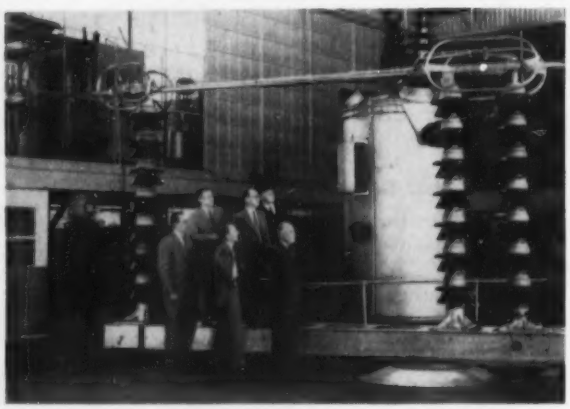
Aluminum Service Connector

(2) Fargo Mfg. Co., Poughkeepsie, N. Y.

This plated aluminum-bodied service connector for all-purpose use has new design features. Standard plating is tin-zinc alloy. The connectors are made with quality controlled aluminum castings having excellent current-carrying capacity, the manufacturer states. They are chemically cleaned and rapidly handled while wet in the plating process so that inherent high contact resistance of aluminum is replaced with the low contact resistance of the plated surface. Plating also makes it unnecessary to clean the jaws before installation in the field and allows copper conductors to be used in either groove, it is pointed out.

The 9003-AP connector is massive with wide jaws for large areas of contact. Each conductor strand is brought under a pressure area, giving an even distribution of current through the conductor at the joint. According to the manufacturer, more than adequate conductor separation is secured with a soft, thick aluminum spacer pad that forms around the strands, reducing galvanic corrosion on transfer surfaces.

The one-piece connectors have a range from two No. 8 solid to two No. 4 ACSR. One connector replaces several sizes needed formerly, it is stated.



Disconnecting Switch

(3) R&IE Equipment Division of I-T-E Circuit Breaker Co., Greensburg, Pa.

This new 330-kv TTR disconnecting switch is claimed to be corona free at 300 kv to ground closed and at 275 kv to ground open, with less than 500 microvolts radio influence at these voltages.

Featuring the manufacturer's new straight-line high momentary jaw, the switch has a 1,600 amp continuous current rating and a 1,300 kv impulse withstand voltage. The blade is step-tapered and operates on the sealed-pressure shuntless hinge. The base consists of two 12-in. I-beams with welded reinforcing members. Torsional interphase connections are geared for 200° travel of the blade crank. Maximum operating effort of 30 lb is required on a 12-in. geared handle to engage three-pole contact pressure. Less is required for other opening and closing switch operations.

The unit shown is one single pole of 34 three-pole switches.

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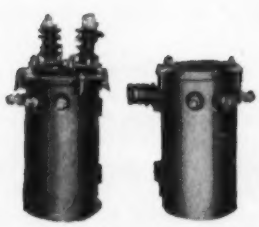
It's the peak performance that counts with transformers in the operating picture. Increasing uses of electricity have shoved the demand curve up sharply . . . given your equipment a steeper, higher path to climb. Stamina is a must today . . . failures can mean the difference between efficiency and loss. Moloney Hiper-Core Transformers have improved short-time overload characteristics which provide excellent peak load performance. Their design also permits rapid cooling, promotes longer operating life . . . in short, peak performance.



Moloney HiperCore Distribution Transformers are available from stock in all standard ratings from 3 Kva up in both Conventional and CSP designs.

It is not surprising that Moloney Transformers offer more . . . for each is really the product of 58 years of experience. The mark of Moloney has alway meant transformers built with the best in engineering, workmanship and materials. To make your system better . . . make it Moloney all along the line. MEB4-11

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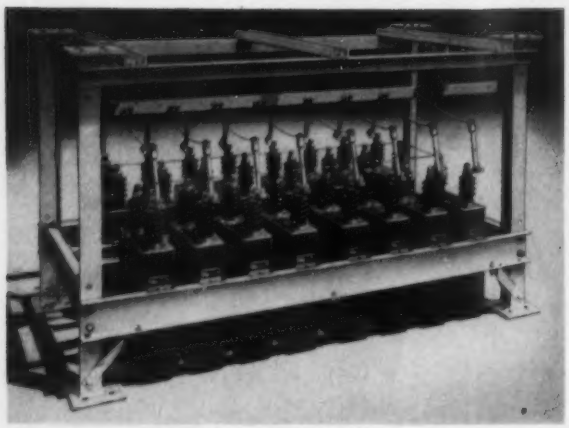


Capacitor Blocks

(4) Line Material Co., Milwaukee 1, Wis.

Factory-assembled capacitor blocks for use in open-type banks at transmission, subtransmission and distribution voltages were designed to reduce field installation charges and to give flexibility for relocation and for changes in bank size as circuit conditions require.

A standard block has two rows of 25-kvar, 5-kv or 8.7-kv class capacitor units connected in parallel and mounted in a galvanized steel frame of standardized dimensions. Ready for installation with similar equipments, available blocks have capacities of 250, 300, 350, 400, 450, 500, 550 and 600 kvar. Individual expulsion-type fuses protect units. Base insulators are used to insulate banks from ground for full system BIL and stacking insulators may be used between frames.

Socket Eye

(5) The Brewer-Titchener Corp., Cortland, N. Y.

For dead-ending ball and socket single suspension strings to standard compression dead ends, the new 3058 socket eye is drop forged from AISI C-1038 steel, full heat-treated and hot-dipped galvanized; is rated at 35,000 lb ultimate strength; weighs 2.30 lb. By varying the eye boss and hole diameter, it can be adapted to fit all standard compression dead-ends, which hold 1/0 through 1,590,000 CM ACSR conductor.

The manufacturer points out that, because the ball in a fog-type ball and socket insulator is located at a considerable distance above the lower petticoat skirt, a much longer adapter connecting length is necessary than that required in a standard suspension insulator, and therefore this 5½ in. socket eye was developed for dead-ending with either insulator.

Electrical Insulation Resin

(6) Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

A new epoxy-type electrical insulation resin is claimed to have a usable life of from three to five days before setting. Cure time for this Scotchcast resin No. 3, which comes in a two-part liquid form, is from two to four hours at 250 F, with a longer cure at lower temperatures.

According to the manufacturer, typical applications are for embedding resistors, unitized electronic circuits, preamps, torroids and audio and power transformers — hermetically sealed — in a solid block of resin to give trouble-free operation under adverse conditions.

Because of its low viscosity, it is recommended by the manufacturer for impregnation of coils where increased resistance to moisture is desired.

Among features listed are 100% solids nature with a minimum of shrinkage upon curing; no chemical degradation within the operating range from minus 65 to 250 F; resistance to acids, alkalies, solvents and oils and excellent adhesion to most metals, plastics and conductors.

Electrical characteristics include a dielectric strength of from 1,000 to 1,500 v per mil on thin sections, a low dissipation factor over a wide temperature range at frequencies of 60 cycles to 30 mc and a stable dielectric constant within this range.

A-C Switch

(7) Harvey Hubbell Inc., Bridgeport, Conn.

Available now in single-pole and three-way types, the new Topper switch was designed for quiet operation and long life at full rated loads, its manufacturer states. The 15-amp, 120-277-v a-c switch was developed to withstand inductive load characteristics of fluorescent lighting installations and is claimed to be suitable for fluorescent or incandescent a-c installations in hospitals, nurseries, conference rooms and other areas where quietness is essential; to withstand resistance, surge or inductive loads found in heaters, incandescent and fluorescent lamps and motors.

According to its manufacturer, it may be used at full-rated capacity on F loads at voltages from 120-277, on inductive loads 120-277 v and on incandescent lamp loads and may be used also for motor loads 120-277 v at 80% of current switch rating.

Contact Paste

(8) Jasper Blackburn Corp., 35 Madison St., St. Louis 6, Mo.

Developed for lowering the resistance of all electrical connections and providing long-term corrosion protection, Contax is claimed to be particularly beneficial to aluminum and bimetal connections.

According to the manufacturer, metal particles held in a stable suspension provide the means for lowering electrical resistance. The metal particles tend to penetrate the oxide film on the conductors and to improve the conductivity of the joint. The oxide inhibited, neutral petroleum base vehicle carrying the metallic particles seals out air and moisture, it is explained.

Contax is applied with a brush. It is said to have excellent adherence to metal and to withstand the washing action of wind and rain. It will not drop off of connections with temperatures up to 350 F, it is stated.

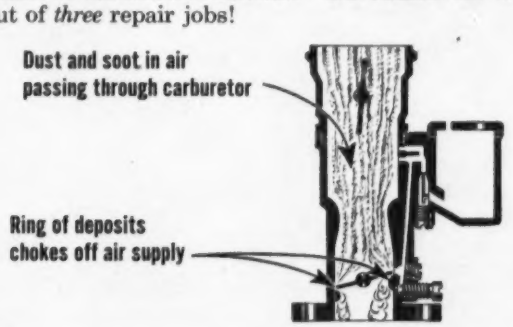
The manufacturer makes a double-barreled conductor cleaning brush as a companion product. Contax is supplied in half-pound tubes; pint, quart and gallon cans.

CUT YOUR OPERATING COSTS WITH

THE World's first detergent-action gasoline

An entirely new kind of motor fuel that ends forever the biggest single cause of engine trouble

Now, you can increase gas mileage, cut the cost of tune-ups, carburetor repairs and down-time with "*Detergent-Action*" Chevron Supreme *or* Chevron Gasoline! These entirely new fuels were made possible when Standard research discovered the real cause of carburetor troubles—the reason for *one* out of *three* repair jobs!



Tiny bits of soot, gum, and dust in the air are trapped in the carburetor of *every* gasoline engine. They gradually build up deposits that cause rough idling, gas waste, loss of power, and stalling at low speeds. Then the carburetor needs to be repaired or adjusted with a "tune-up."

Now, "*Detergent-Action*" Chevron Gasolines *clean out* these deposits while engines run, and prevent new formations with the first tankful.

Savings like these are the result: In one of the many typical case histories, a fleet operator reported *savings up to $1200 a month* after using "*Detergent-Action*" Chevron Gasoline for six months.

For more information on how "*Detergent-Action*" Chevron Gasolines can cut your operating costs, call your Standard Representative; or write to 225 Bush Street, San Francisco, California.

Try "*Detergent-Action*" Chevron Gasolines today —at no increase in price!

CHEVRON SUPREME GASOLINE

CHEVRON GASOLINE

STANDARD OIL COMPANY OF CALIFORNIA

★ Patent applied for

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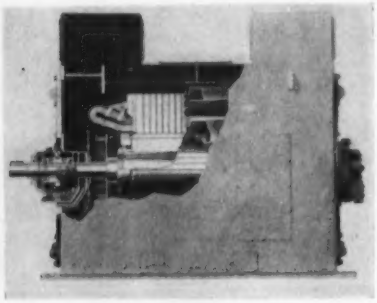

Motor

(9) Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee 1, Wis.

A redesigned two-pole 60-cycle, 3,600-rpm squirrel cage motor in ratings of 900 hp and larger is particularly applicable to boiler feed service; has a new ventilation system, improved oil seal, top air intake and discharge, increased protection for the bearing.

Redesign of air passage materially reduces noise levels, according to the manufacturer, and further noise reduction has been secured by changing fans on the rotor from axial flow propeller to centrifugal type. Interior core ventilation has been redesigned to incorporate spiral ventilation, eliminating need to vent duct the rotor and avoiding dirt and dust problems, it is pointed out.

Air inlet and air outlet on the motor have been shifted to the top of the machine and consequently dirt is not sucked into the inlet from the floor and cleaning water cannot splash into it, the manufacturer states. The warm air discharge is directed away from persons working around the motor.

Capsule bearing design has been revamped to prevent oil leakage in high-speed operation. The bearing housing is cored to provide atmospheric pressure relief so that oil vapors will not get into the machine.

Air Cleaner

(10) Westinghouse Electric Corp., Air Conditioning Division, Department T-556, 200 Readville St., Hyde Park, Boston 36, Mass.

A new ceiling-suspended model of the home Precipitron electrostatic air cleaner is designed for simple installation in the main return air duct of a forced-air heating system. Weighing 200 lb, one-third less than its predecessor, this model PH-122 fits the needs of the average five- to seven-room house, the manufacturer states. It handles from 1,000 to 1,200 cu ft of air per minute.

(For More Data, Use Coupon, Page 64)

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Arrester Plates

(11) General Electric Co., Pittsfield, Mass.

Precision-molded mycalex plates, capable of withstanding the tremendous impact caused by discharge of 100,000 amp, have permitted a 20% improvement in protection level for the manufacturer's new Thyrite Magne Valve arrester, it is claimed.

G-E 2803 mycalex forms an integral part of the arrester's gap unit design. The gap unit includes parallel sets of gap electrodes connected in series with magnetizing coil, all mounted on mycalex plates.

Mycalex, a plastic insulating material composed of ground mica and special glass, has a dielectric strength of 400 v per mil; a dielectric constant of 6.9 for 60 cycles; 240 arc resistance per second; remains physically unchanged at temperatures up to 662 F.

Underground Feeder

(12) National Electric Products Corp., Gateway Center, Pittsburgh, Pa.

Nepconol UF cable comes in single conductor in sizes 14 through 4; in two conductor, with or without ground wire, and three conductor in sizes 14 through 10 for branch circuit and feeder services. Black is the standard color for the single-conductor; ivory for the two- and three-conductor cable.

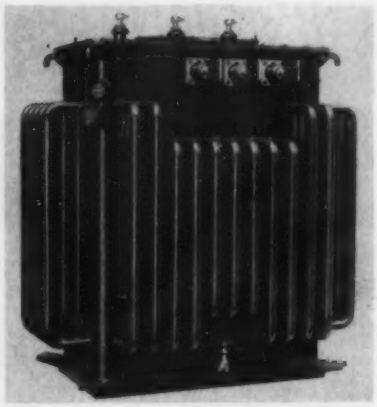
Thermoplastic insulation and jacket give damage-resistant characteristics, according to the manufacturer, who states that the cable is unusually impervious to soil elements, and is resistant to moisture, acids and oils. The cable is strengthened and stripping is facilitated by fiber glass members that separate the conductor insulation from the cable jacket, it is stated.

Underwriters' listed and conforming to the 1953 code, the cable is also recognized for use as type NMC, the manufacturer points out. It is listed for direct burial of branch or feeder circuits when provided with overcurrent protection.

Pole Grip

(13) Petersen Engineering Co., Santa Clara, Calif.

This patented tool for setting power poles up through energized power lines does not replace the peavey, according to its manufacturer, but does a different job. It enables one man to have complete control of the butt of the pole to guide the top of it safely up between power lines, it is claimed, eliminating one man and safety tool.



Transformers

(14) Line Material Co., Milwaukee 1, Wis.

Core-type Uni-Wound transformers come in sizes 112½, 150, 225, 300 and 500 kva at standard distribution voltages through 14,400 v. The new design has been designated Uni-Wound because the core is physically and magnetically one unit, it is pointed out. Round coils are wound onto each leg of the core.

It is claimed that the new transformers have the same advantages as the present single-phase Round-Wound transformers—excellent cooling, light weight, short-circuit strength, high impulse strength, low exciting current, high short-time overload capacity.

Connectors

(15) Anderson Brass Works Inc., 1112 Peachtree N. E., Atlanta 5, Ga.

A new Dura Grip connector series has clamping members of high-strength bronze alloy and bolts of high-strength silicone bronze; comes in eight sizes from No. 8 stranded copper through No. 4/0 stranded copper. Sizes 6 and 8 are supplied with optional slotted-type Hex head screws for screwdriver installation. Internal-type phosphor bronze spur lockwashers are provided on all sizes.

Jaws on all sizes will open wide enough to install both main and tap conductors at the same time. Disassembly is never necessary, the manufacturer states. Interlocking design on the jaws gives complete enclosure of conductor and very small taps may be used with conductors of maximum size, it is pointed out.

(16) **DOG BITE KIT** — A plastic kit with liquid soap and antiseptic, applicator sponge, adhesive bandages and instructions for emergency treatment of dog bites is offered by B. F. McDonald Co., 5721 W. 96th St., Los Angeles 45, Calif.

First time available NEW

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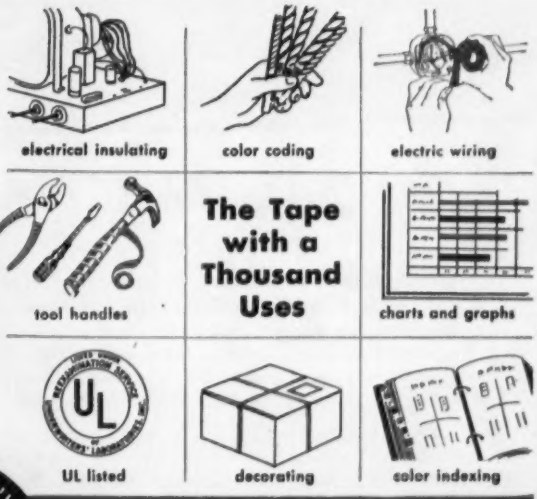

CHARACTERISTICS

Adhesive Value—28 oz. per inch width (according to ASTM D1000)
Tensile Strength—15 lbs. per inch width
Dielectric Strength—1000 volts per mil of thickness
Thickness—0.006
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UP-TO-DATE TRANSFORMER DESIGN ENDS CORONA DANGER FOREVER

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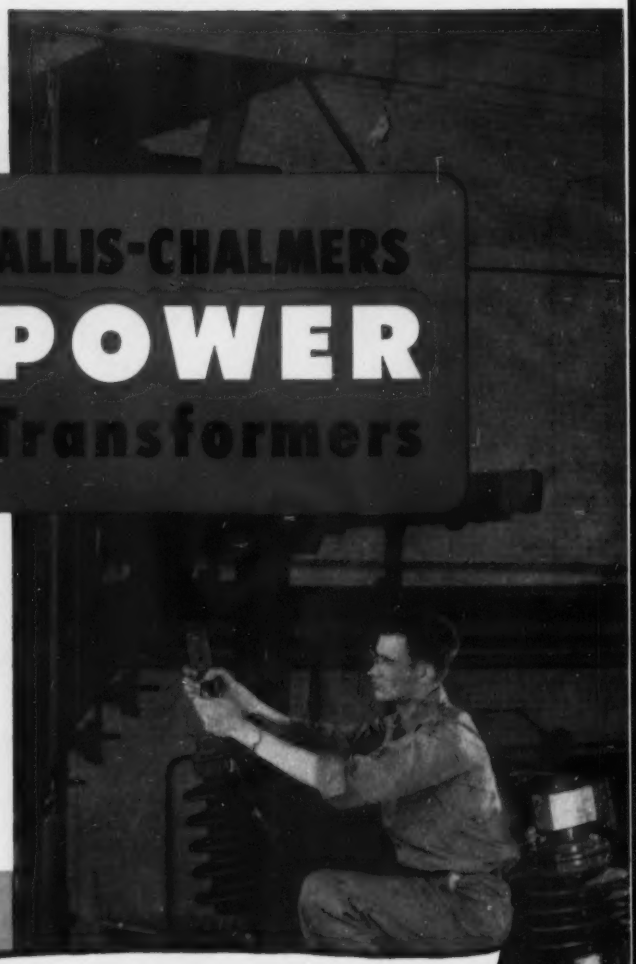
Testing Offers Proof

Testing methods now available provide positive assurance against even the smallest amount of corona. For example, transformers tested in Allis-Chalmers laboratories have gone through as many as 200 impulse shots. Result: inspection proved they were in just as good condition after the 200th shot as before the first.

Accurate manufacture, exhaustive tests, and field performance are proving your transformers will continue to pay off many years after the corona-free seal has been placed on them at the factory.

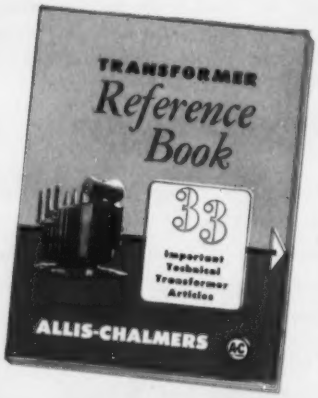
A-4123



Get Important Transformer Information

Here's a convenient source for answers to transformer questions. Allis-Chalmers "Transformer Reference Book," just published, brings you 168 pages of information based on more than fifty years' experience designing and building transformers. It explains transformer theory, gives some of the "whys" behind transformer design, and tells important facts about transformer operation.

The 33 articles in this book were originally published in Allis-Chalmers "Electrical Review." Now they've been brought up to date with new material where necessary. To get your copy, send one dollar to Allis-Chalmers, Milwaukee 1, Wisconsin. Or call your nearby A-C district office and ask for a free, four-page brochure that tells all about this handy, informative book.



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KG NO. 1 GAFF GAUGE Keep this precision gauge handy for a safety check on proper spur pitch. Plated steel—packed in durable plastic case.

1901-MG GAFF GUARDS Protect the all-important spur of your climbers with this new Klein gaff guard. First quality leather with spring clip.

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3200 BELMONT AVE. CHICAGO 18, ILL.

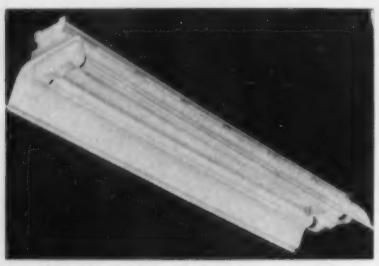
Silvered-Bowl Fixture

(17) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

New designs of concentric-ring luminaires for silvered-bowl incandescents are being made for lamps in ratings from 200 to 1,000 w.

Three vertical rings are placed concentric with the lamp axis to shield the bright neck of the lamp. With this arrangement the light is directed by the reflector in the base of the lamp to the ceiling without the source being visible at any normal viewing angle, the manufacturer points out. Since the shielding ring surfaces are verticle, dirt and dust collections are minimized, it is stated. A burned-out lamp may be changed from the floor by a suction cup device on a handle.

These luminaires have 45° universal swivels at the ceiling canopy so that they may be used with sloping ceilings.



Slotted Reflectors

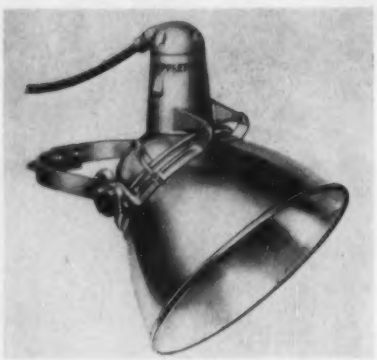
(18) Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

This improved line of all-white slotted-reflector fluorescent fixtures is recommended by its manufacturer for areas where critical viewing tasks are performed. The slots provide an upward component of light of about 8%, it is stated, and thus reduce brightness contrasts, particularly when ceilings and overhead structures are painted white.

In addition the slots create a chimney effect, carrying off air normally retained inside the reflector and avoiding accumulation of dust and dirt, it is pointed out.

(19) LIGHT—A new clamp-type Utilite is offered by the Steber Mfg. Co., Broadview, Ill. It takes PAR-38 and R-40 spot and flood lamps, sun, heat and photoflood lamps; is identified as catalog No. 13.

(20) LIGHT—A new light, the Super Delux 45 made by Duro-Test Corp., North Bergen, N. J., has a new dimension in fluorescent color claimed to incorporate a neutral light source in the upper limit of the visible wave length region producing true color rendition throughout the visible spectrum.



Floodlight

(21) Appleton Electric Co., 1701-59 Wellington Ave., Chicago 13, Ill.

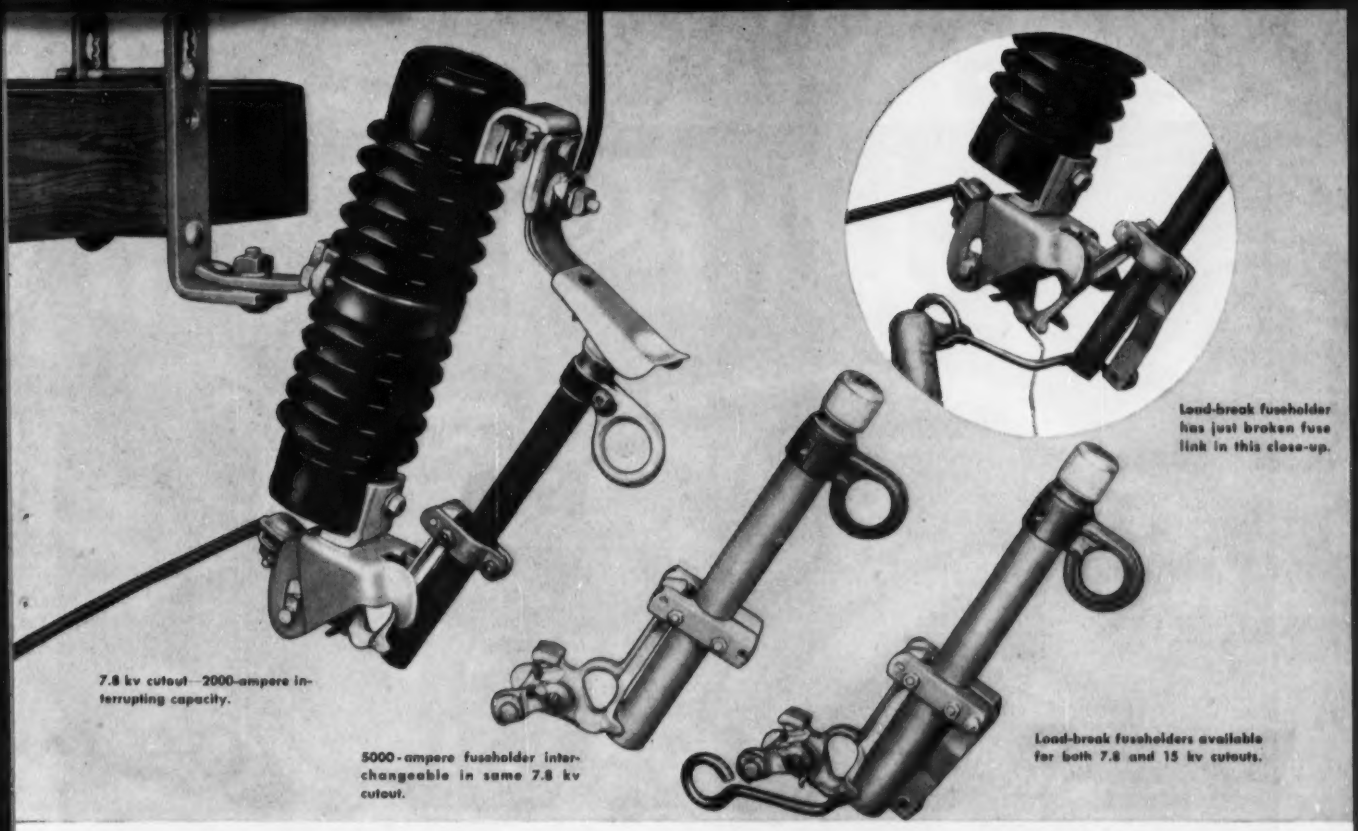
The Intenso floodlight line for athletic fields and other large areas features a rear lamp-holding section that lifts up and forward for servicing. Secured by cam-action flip-clamps, this rear section may be released and swung out of the way in less than five seconds, giving access to any part of the interior, the manufacturer claims.

Other features listed are: a straight-through peep sight for aiming and positioning during daylight installation; hooded louvers for cross ventilation that reduce undue interior condensation and for cooling without letting ice, rain or snow enter vital parts; locking degree indicators that give 1° accuracy in light placement and full 360° horizontal and 100° vertical travel; a heat- and impact-resisting clear glass lens with bullseye trued up with peep sight; heavy-gage steel yoke for support on pole; Alzak heavy-gage aluminum construction and corrosion-resistant reflector.

These floods come in 20° to 90° beam spreads, with 18- or 20-in. etched or polished reflectors. Each fixture comes complete with four feet of No. 12 two-conductor cord.

(22) INDICATING LAMP—A new all-molded indicating lamp for switchboard steel panels features compound color caps that are specially treated to increase the glow of light; a series resistor to give long life expectancy and a standard 24E telephone lamp with slide base to allow easy changing of bulbs. It comes in six colors and for panels up to ¼ in. thick; is approximately ⅛ in. shorter than the company's previous indicating lights. Made by General Electric Co.'s Low Voltage Switchgear Department, Philadelphia, Pa.

(23) LANTERN—An incandescent lantern designed for church lighting is offered by Gruber Lighting, 125 S. First St., Brooklyn 11, N. Y. It comes in two sizes and in antique gold or black, with red or green decorative trim. The larger unit is wired for three lamps in the upper part and one 300-w lamp in the lower part. The smaller one takes one lamp.



7.8 kv cutout—2000-ampere interrupting capacity.

5000-ampere fuseholder interchangeable in same 7.8 kv cutout.

Load-break fuseholders available for both 7.8 and 15 kv cutouts.

Load-break fuseholder has just broken fuse link in this close-up.

NEW G-E OPEN DROPOUT CUTOUT

For FAULT PROTECTION—standard or heavy duty and LOAD BREAK—up to full load at any power-factor.

New simplified design of General Electric 7.8 kv and 15 kv, 100-ampere cutouts have these extra features:

Birdproof Construction accomplished by unique method of clamping the mounting support to the opposite side of insulator from live parts.

Liberal electrical and mechanical strength. New hollow tube wet process porcelain has under-cut petticoats for generous creep and strike distance; and porcelain insert fired within tube provides inside solid barrier between top and bottom live parts. Screen prevents insect nest within porcelain. Clamping U-bolt around porcelain is insulated with molded polyvinyl chloride having excellent insulating and weathering characteristics.

Compression bolting to porcelain—top and bottom fittings are bolted to insulator with porcelain under compression—for maximum mechanical strength. Compression clamps inside the porcelain maintain tight assembly.

Shielded top contact and latch—by roof-shaped contour and having ball-point contact surface to top of fuseholder, the top contact and its latch are protected from dirt deposits and sleet.

Other distinctive features are retained: Hinge guides allow slamming fuseholder from any angle; threaded cap seal at upper end of fuseholder forces expulsion gases downward; silver-plated contacts shielded from corrosive agents; vertical or angle-tilted swivel mounting with EEI-NEMA bracket; latch provides time-delay opening—assures fault current interruption before dropout action occurs; fuseholder tube of fiber and fabric-base Textolite* is water resistant, will not warp or split; close coupling of fuseholder to porcelain prevents multiplication of recoil forces.

For more information on these new open cutouts, contact your nearest G-E Sales Representative, or write to General Electric Company, Section 433-4, Schenectady 5, New York.

*Reg. trade-mark of General Electric Company

Progress is our most important product

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

DROP-FORGED

Stronger-Lighter

Efficient

Full Range of Sizes

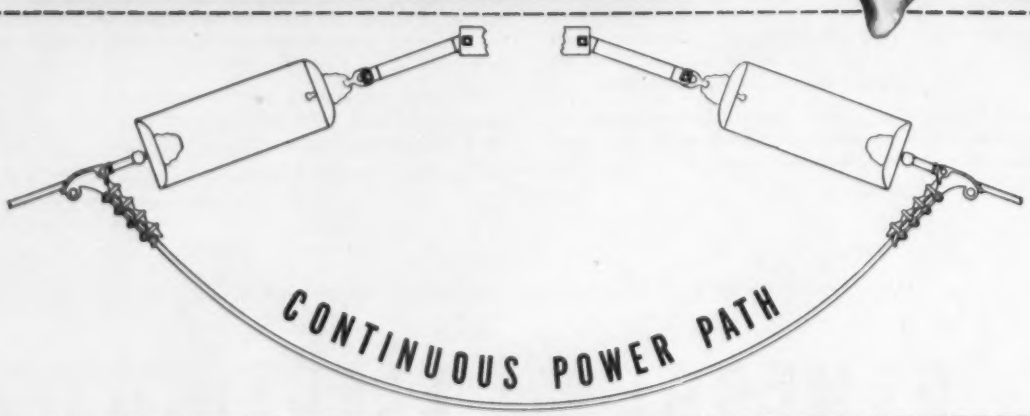
Cool Operation

Economical

Increased Conductor Life

MINIMUM POWER LOSS

High Slip Strength



for GREATER STRENGTH

BTC

M.P.L. ALUMINUM

STRAIN CLAMPS

for A.C.S.R. and All-Aluminum Conductors

M.P.L. MINIMUM POWER LOSS

It has been proved that the use of a non-magnetic Aluminum Clamp Body reduces hysteresis and eddy current losses to a minimum. The actual power loss in M.P.L. Clamps is approximately one-tenth of that in all-ferrous Clamps.

HEATING EFFECT

High amperage current raises the temperature of the conductor within ferrous Clamps beyond safe limits, anneals the conductor, materially reduces its strength and fatigue resistance and has been the current-limiting factor on some systems. The clamped conductor and the M.P.L. Clamp operate at lower temperature than that in the span.

HIGH STRENGTH, LIGHT WEIGHT

Forgings, in any metal, are invariably employed where better strength, soundness and finish are required than can be obtained by other processes. Forging produces a fine, close-grained structure with grain flow following the contour of the part. It develops optimum mechanical properties and ability to withstand severe loading, sudden shock and frequent reversal of stress. The M.P.L. Clamp Body is Forged Aluminum alloy, fully heat-treated. In the heat-treated condition, the ultimate strength and hardness are more than twice (and the yield strength and endurance limit more than three times) that of alloys used in other processes. Catalogued strength ratings are conservative and are exceeded in actual tests. Undesirable weight is eliminated without sacrifice of strength.

SLIP STRENGTH

High holding power is attained by the combination of snubbing action and wave form body and keeper.

CONDUCTOR LIFE

M.P.L. Strain Clamps are designed to minimize the effects of conductor vibration. The light weight assembly with separate, rather than integral, connecting arms is free to oscillate at a point near to its center of mass, effecting a low moment of inertia and allowing the free passage of vibration waves. Generous snubbing radius of Clamp mouth prevents severe concentration of bending and tension stresses.

CORROSION

The close-grained, non-porous structure of the Forged Aluminum Alloy Body effectively prevents the destructive internal seepage of corrosive elements, disintegration of metal and eventual failure.

ECONOMICAL, PERMANENTLY EFFICIENT

M.P.L. Strain Clamps offer low initial cost—easy, quick installation—no cutting or lowering of the conductor— no special tools or cumbersome installation devices—no trouble inviting bolted jumper loop connectors—and no interruption of continuous power path through the jumper loop.

FULL RANGE OF SIZES

The M.P.L. line offers a choice of exactly the right Clamp for each size of A.C.S.R. or All-Aluminum Conductor. The close dimensional fidelity of the die-forged parts makes unnecessary any bore size allowance for manufacturing variations in the Clamps.

Specify BTC M.P.L. Aluminum Strain Clamps from your insulator manufacturer. They are an important part of BTC's complete line of forged transmission line hardware.

Sold Through Your Insulator Manufacturer Only

Drop Forged BTC *Hi-Line Hardware*

The BREWER-TITCHENER Corporation

Cortland · New York

Chicago contractor whips

PROBLEM:

Wiring in corrosive atmosphere

ANSWER:

KNOB and TUBE wiring

Gets greater load capacity

A Chicago electrical contractor, installing the electrical system for a new hide-curing plant, was faced with a problem of high humidity and corrosive atmosphere. His solution—Knob and Tube wiring backed by the approval of a very safety conscious city inspection department. Knob and tube wiring is safer—easier to install and at lower cost—reduces maintenance—and will last indefinitely. Safely carries greater loads than any other method of wiring—from 33 % to 100 % more.

You can get all these qualities—and more—with Knob and Tube wiring. When you want the finest—for tough electrical wiring installations—specify Porcelain Products Knobs and Tubes. They're backed by over 60 years experience in the manufacture of electrical porcelain insulators. Contact your nearest jobber or write us direct.

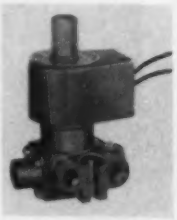
MANUFACTURERS OF ELECTRICAL PORCELAIN SINCE 1894

60 years **PP —INC—**

Porcelain Products, Inc.
FINDLAY, OHIO

Solenoid Valves

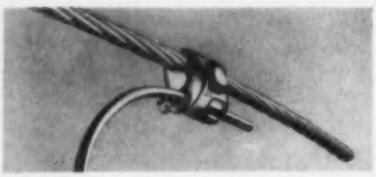
(24) Automatic Switch Co., Orange, N. J.



The midget four-way solenoid valve stands 4 7/16 in. high; has an overall length under 3 in., depth of 2 in. Permissible pressures range from 10 to 125 lb for a-c and up to 50 lb for d-c. Pipe size is ¼ in., orifice diameters are 1/16 in. inlet, 3/32 in. exhaust. Power consumption is 10 w. This bulletin 8345 valve was designed for handling air, water, light oil and other noncorrosive gases and liquids at temperatures up to 212 F.

Features claimed are compactness; rapid operation up to 400 cycles per minute; poppet-type seats and disks; comes with standard, watertight or explosion-proof solenoids; can be mounted in any position; single operating coil; tested for millions of operations; simple maintenance; tight seating.

Standard voltages are 115 or 230 a-c, 60 cycles, 115 v d-c. Other voltages and frequencies may be secured. Continuous-duty solenoid coils are either Class A supplied standard or Class H high-temperature, glass-silicone-insulated coils. Details in bulletin 8345.



Parallel-Groove Clamp

(25) A. B. Chance Co., Centralia, Mo.

A new type parallel-groove clamp can be used for connecting any type and combination of main line conductors and tap wire, according to its manufacturer. This aluminum general-purpose clamp has a heat-treated aluminum body, protected with a fortified cadmium coating that resists corrosion in the connection. It may be used for connecting copper to aluminum, aluminum to copper and copper to copper.

The heavy cadmium coating over the whole connector eliminates the possibility of accidentally putting the connector on wrong when making bimetal connections, the manufacturer points out. The copper conductor can be installed on either side.

Service Entrance Caps

(26) Killark Electric Mfg. Co., Vandeventer and Easton Ave., St. Louis, Mo.

The Multi-Grip entrance head will fit either a thinwall, threaded or threadless heavywall conduit; is said to be easy to install because the conduit need not be pulled away from the building. The cap slips over the top end of the pipe and fastens in place with two screws.

These entrance heads are made of Killark Alumalloy for light-weight and rustproof qualities; are designed with plenty of wiring space for easy installation.

Circuit Breaker

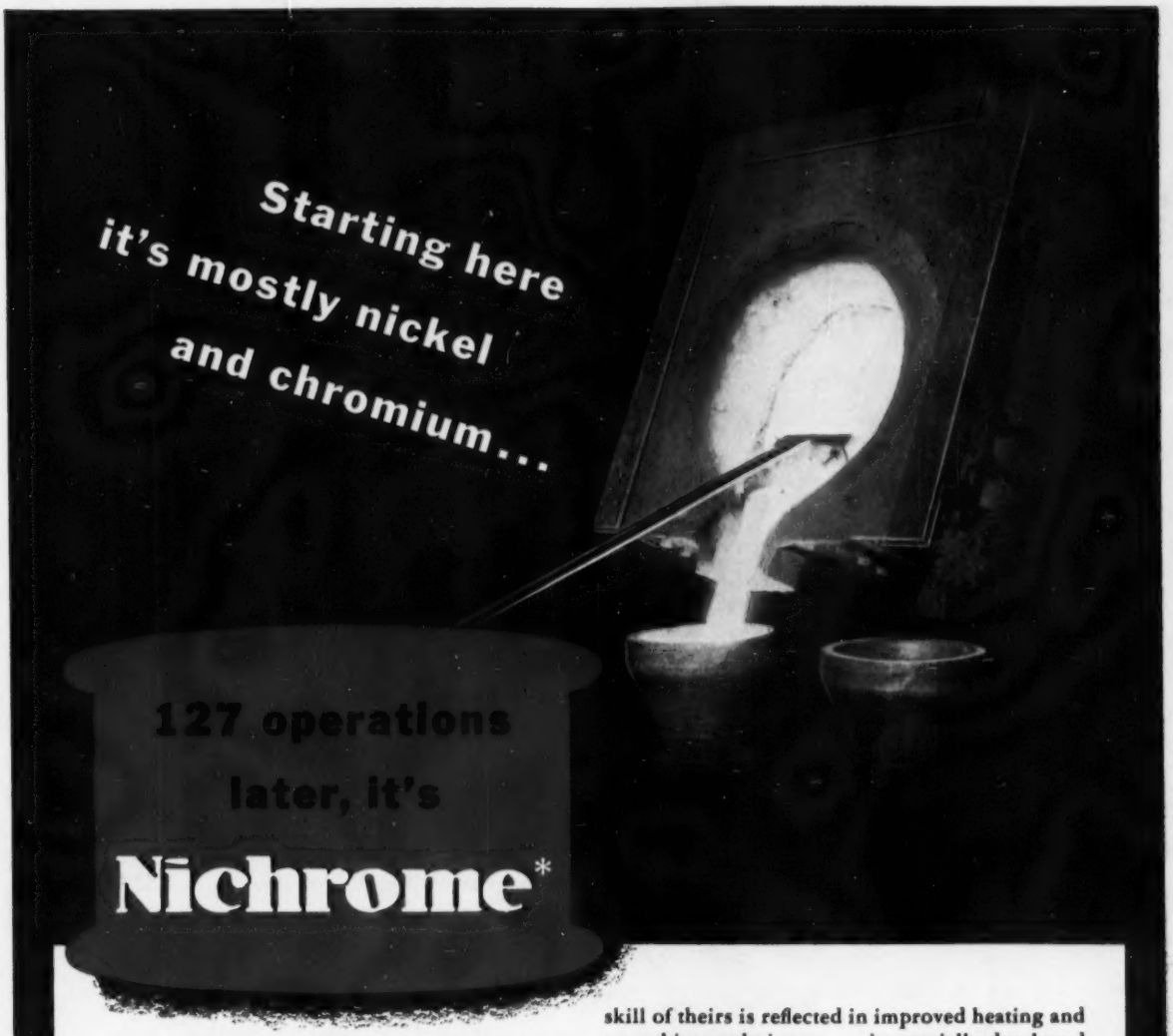
(27) I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa.

This two-pole EQ molded case circuit breaker is for use in panelboards, load centers or individual enclosures. An integral part of the trip mechanism is a common tripper bar arrangement, which eliminates the handle tiebar previously used to join two single-pole breakers.

Compact two-pole breaker is twice the width of single pole EQ design, the manufacturer states. It combines thermal and magnetic tripping for complete protection. Thermal action guards against small overloads. Instantaneous magnetic trip protects against short circuits.

Features include arc chutes, silver alloy contacts and a quick-make, quick-break trip-free mechanism. These breakers are factory-calibrated at controlled temperature (25 C) and factory-sealed to prevent tampering. Underwriters' listed and available in ratings from 10-50 amp; 120/240 v a-c; 5,000 amp interrupting.

For more data fill in coupon on page 64



There are several excellent nickel-chrome combinations on the market. But there is only one Nichrome*.

What is it that makes this alloy the universal standard by which engineers judge the properties of heat and corrosion resistance? There is always at least one extra ingredient added to the nickel and chrome. That is . . . the supreme mastery of the Driver-Harris specialists, gained in their 55 years of melting and drawing experience. This hard-won skill of theirs is reflected in improved heating and quenching techniques . . . in specially developed deoxidizing anneals . . . in expert and precise control of every technical process of the entire manufacturing cycle. Sometimes, indeed, there are as many as 127 distinct operations between melting crucible and the finished wire, strip, or rod.

In recognition of its unique properties, the United States Patent Office in August, 1908, granted solely and exclusively to us the trademark NICHROME. There is only one Nichrome, and it is produced by Driver-Harris.

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

5320 Santa Fe Ave., Los Angeles 58
917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

*T. M. Reg. U. S. Pat. Off.

SPECIFY I-T-E SWITCHGEAR

FOR

- maximum protection
- maximum service continuity
- maximum value

Switchgear is an *important* purchase. That's why you should investigate the many advantages of I-T-E quality equipment. They add up to a sound investment which pays yearly dividends in complete electrical protection and service continuity.

Maximum protection—I-T-E switchgear contains industry-proved air circuit breakers engineered for long, trouble-free performance.

Maximum service continuity—The OD-2 trip device provides true coordinated selective tripping for the most effective type of circuit protection.

Maximum value—The modern I-T-E switchboard incorporates, along with I-T-E breakers, the highest quality bus, instrument transformers, control wiring, and required accessories. And to save you time and money . . . to assure the best application of equipment to every job, I-T-E provides the maximum of individual engineering assistance.

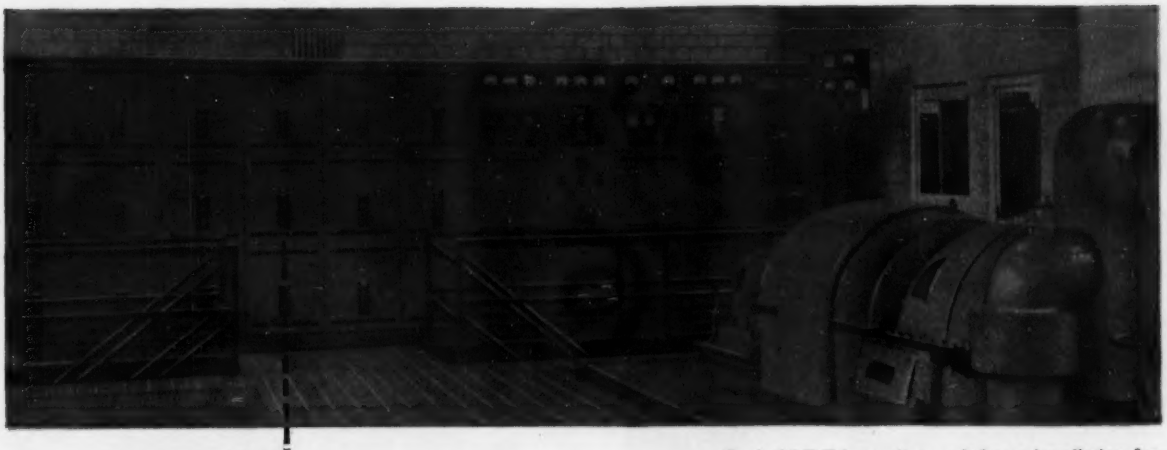
Switchgear is truly an investment. Specify I-T-E, and receive extra dividends now and throughout the life of the equipment.

For details, contact the I-T-E field office nearest you. Look in your classified directory under "Electrical Equipment," or write for Bulletin 6004A.

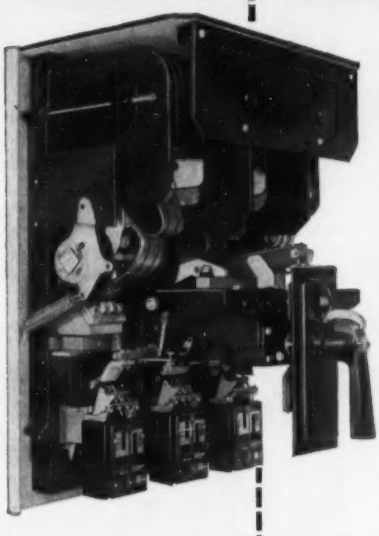
THE SYMBOL OF QUALITY SWITCHGEAR

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STS., PHILADELPHIA 30, PA.



Typical I-T-E low-voltage switchgear installation for modern, efficient control of power generators.

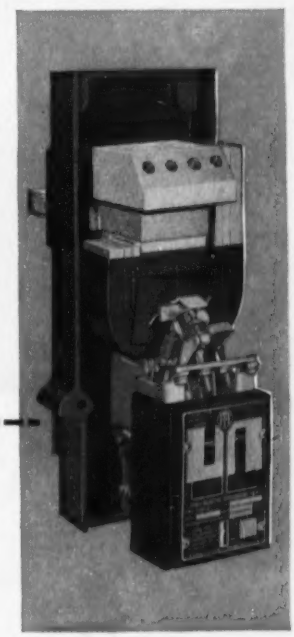


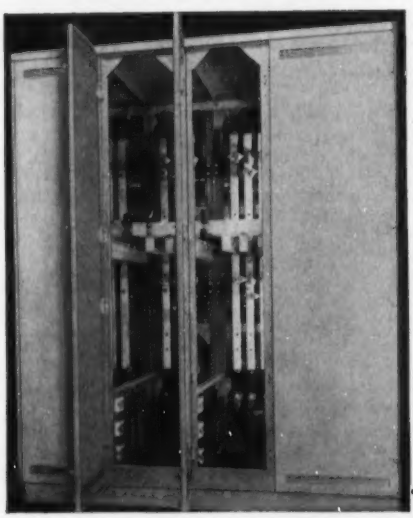
PROVED CIRCUIT PROTECTION

I-T-E air circuit breakers are sturdy, metal-base units with complete insulation of all current-carrying parts. The high-pressure silver contacts are strong, durable, and fast operating. Reliable contact action and efficient magnetic arc chutes assure positive interruption in a small space. Maximum flexibility, simplified testing and inspection are made possible by the horizontal draw-out feature.

COORDINATED "SELECTIVE TRIPPING"

This *direct-acting* OD-2 trip device isolates system faults by tripping only the breaker nearest the fault. The OD-2 is a compact, shock-resistant, sealed unit. "Dual selective," it offers precise long-time delay in seconds and minutes, and short-time delay in cycles.

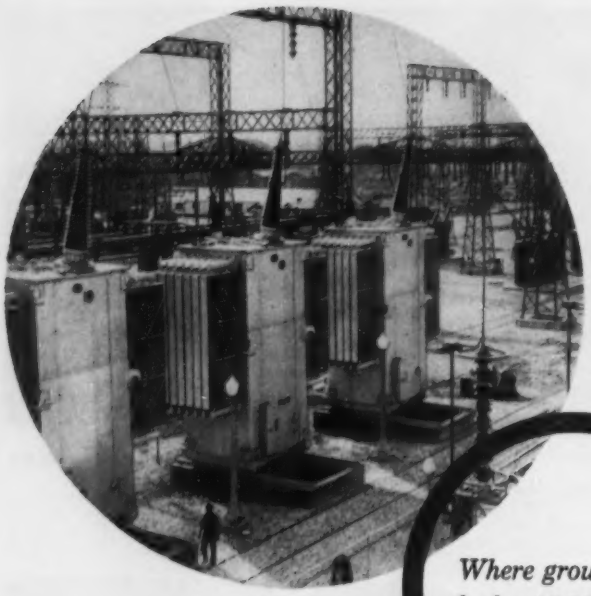




ENGINEERED FOR SERVICE

The entire switchboard is carefully engineered to provide accessibility of components . . . safety for personnel . . . long life . . . ease of operation. Typical of its convenient design is the rear section with its full-height hinged doors. Rugged, structure-high frames eliminate the need for cross-bracing. Thus cable connections can be made simply and easily. Main horizontal bus is located deep inside the compartment—a construction feature which allows ample space for instrument transformers, bus duct, and cable connections. Generous-sized bus is braced to withstand maximum short-circuit conditions.

LOW-VOLTAGE SWITCHGEAR



Where ground must be kept **BARE** *of weeds and grasses...*

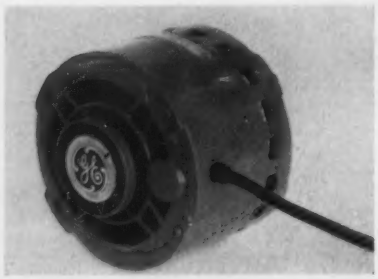
BORASCU®
WEED KILLER

BORASCU is the answer to your weed problems! Use this weed killer about stations, transformer and yard areas, fence lines, pole yards-lines, and all places where ground should be kept bare of fire-hazardous and unsightly vegetation. BORASCU destroys and prevents regrowth! A single application may keep an area cleared for 1 to 2 years! And this low-cost material is SAFE... nontoxic, nonflammable... won't corrode ferrous metals. Try it!

So Easy to Apply...

NO MIXING...
NO WATER TO HAUL
•
NONPOISONOUS
•
NONCORROSIVE
•

Write for Literature Now! **PACIFIC COAST BORAX CO.**
DIVISION OF BORAX CONSOLIDATED, LIMITED
630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

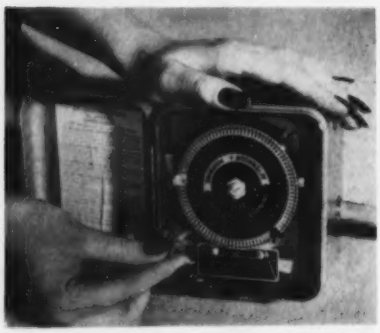


Heavy-Duty Motor

(28) General Electric Co., Schenectady 5, N.Y.

A new 5½-in. diameter shaded-pole motor (KSP-39) was designed for heavier duty at increased efficiency and low input current, according to its manufacturer. It is available in ratings of 1/12, 1/10, ⅛ and 1/6 hp for use on room air conditioners, furnace fans, unit heaters and coolers, window fans and general fan and blower applications.

Optional features include internal baffling, single and double shaft models and resilient-base, cushion-ring or shaft-end mounting.



Air Conditioner Timer

(29) Tork Clock Co., Mount Vernon, N. Y.

Designed to convert any room air conditioner into an automatic unit, the 1919-GSK air conditioner timer is plugged into an a-c outlet, with the air conditioner plugged into its side tap. On and off trippers on the 24-hour dial control the air conditioner. For offices, a calendar wheel provides for keeping unit off on holidays.

(30) RELAY—An improved model of its HZM modified zone distance impedance relay has been announced by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. This relay was designed to give high-speed protection for transmission lines from phase faults occurring on single lines, closed loops and parallel lines and to give backup protection for adjoining line sections. It is rated at 1-10 ohm range, 115 v, 60 cycles operating winding and 125 and 250 v d-c trip circuits.

a new twist ON SAVINGS...

fine **FANNER**

Superformed ARMOR RODS provide lasting line protection!

as easy as

Two or more individual rods are taken from pack. Note the "spring" in the rods and the smooth ends that result in quick, rugged applications.

Rods are laid against the conductor as a group and then easily turned in a rotary manner around conductor.

More groups of rods are added in the same manner, depending on size of conductor—and the job is done easily—in the matter of minutes!

Now . . . the extensive production facilities of the FANNER plants . . . from the control of the raw materials to the finished product . . . have combined to produce a truly outstanding armor rod. Rigid manufacturing controls and field testing have proved that fine FANNER Armor Rods "work with the lineman" and "work for the line."

Through exclusive methods of fabrication, greater dimensional accuracy is produced in the rod. Stresses and strains that may cause distortion of wire when formed by other methods are eliminated by FANNER'S special preforming process.

As a result, the chance of poor installation is eliminated —no tools, no wrenches, no special skills are required— application time drops to a minimum. Fine FANNER Armor Rods require no end clamps—they hold the line in a vise-like grip, yet can be removed easily and re-used over and over again.

With all their extra qualities and features, fine FANNER Armor Rods cost you no more than ordinary types. They are available in both aluminum and galvanized steel for all sizes of conductors. Each size is made to fit each particular size of conductor.

For more complete information and prices on new, fine FANNER Armor Rods, write today.

SALES REPRESENTATIVES WANTED!

● The demand for fine FANNER Superformed ARMOR RODS is growing rapidly because of the greatly expanded use and unlimited applications of armor rods in the electrical field. An exceptional opportunity is offered in several territories to representatives who want to associate themselves with a substantial, recognized company with over 60 years in the manufacturing field. In writing, please cover background of experience in detail.

THE FANNER MANUFACTURING CO.

Brookside Park Cleveland 9, Ohio

Specify Flexible Bronco 40!
You know exactly what you get. Its value is vulcanized into the jacket.
BRONCO 40
BRONCO 40 RUBBER TYPE S 2 COND #16 600V—40% RUBBER BY WEIGHT
now made with a
40% by weight
RUBBER JACKET
and is so branded!
the only 40% rubber-jacketed portable cord with branded jacket. Self-measuring, too—branding is repeated every 2 feet!

BRONCO 40 is recommended for inside, non-oily locations. Where severe conditions are encountered and maximum protection is required, the cord and cable to specify is **BRONCO 60** *CERTIFIED* with 60% by weight *Neoprene* branded jacket.

SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS

Manufactured by **WESTERN INSULATED WIRE CO.**, Los Angeles 58 • California

BULLETINS ETC.

(31) CABLE—A 140-page illustrated book containing engineering references and descriptions of insulated wire and cables made for the electric utility industry has been prepared by the electrical wire and cable department of U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y. It has chapters on the company's insulation compounds, jacket compounds, service, street-lighting, power and control cables, power and lighting wires and cables, bare and weatherproof wires and cables, portable cords and cables and insulated aluminum conductors.

(32) SYSTEM INVESTMENT — An analysis of distribution investments, a list of factors involved in determining optimum substation size and a discussion of the types of circuits supplying distribution substations is contained in a new G-E booklet, "How to Reduce System Investment by Distribution System Planning and Substation Selection." Also given in the bulletin are seven trends in low-cost system expansion.

(33) HEATING UNITS—A 23-page booklet on electric heating units is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., as B-6161. It gves data on heaters, thermostats and snap switches for users of industrial electrical units. Tables list wattage required, supply voltage and dimensions; drawings give construction details and mounting instructions.

(34) BREAKERS — Type RHE reclosing oil circuit breakers, 115 to 287.5 kv, three-cycle interruptng time, are described in catalog 585 from Pacific Electric Mfg. Corp., 5815 Third St., San Francisco 24, Calif. These units have interrupting ratings to 15,000,000 kva at 287.5 kv.

(35) DEVICES — New phenolic sockets and a new push-button brass socket are described in bulletin S-54 from McGill Mfg. Co., Valparaiso, Ind.

(36) LIGHTING — A 12-page bulletin on prefabricated lighting and tool lines for industrial uses is offered by Jey Mfg. Co., Department SAL-40, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

(37) COILS—A bulletin on magnet coils and electrical windings covers applications, manufacture, conductivity and resistivity; has magnet wire characteristics and other tables. Offered by Jeffries Transformer Co., 1710 E. 57th St., Los Angeles 58, Calif.

(38) ELECTRONIC COMPONENTS—I-T-E Circuit Breaker Co., 19th & Hamilton St., Philadelphia 30, Pa., has prepared a 36-page guide to electronic components. Charts, tables, drawings and selection and application information are given in this catalog R-200.

(39) TRANSFORMER ASSEMBLY—A new type of preassembled distribution unit is described in an eight-page bulletin, No. 8534, from Pennsylvania Transformer Co., Box 330, Canonsburg, Pa.

To Secure Bulletins Fill in Coupon on Page 64

GET LOWEST INSTALLED COSTS . . . EVERY TIME . . . WITH

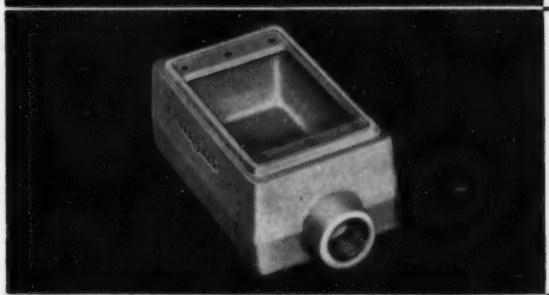
GEDNEY CONDUIT BODIES

MALLEABLE IRON—HOT DIP GALVANIZED

YOU CAN'T HELP but cut installation costs with Gedney Conduit Bodies. Every one of them is accurately machined and threaded . . . smooth finished . . . made of unbreakable malleable iron . . . inspected for complete perfection. On top of that, they're special hot dip galvanized to assure absolutely top life on the job . . . and they come in all types and sizes from ½" to 4"

AMONG GEDNEY'S COMPLETE LINE ARE:

TYPE LB—Threaded—for heavy wall rigid conduit. Used with Gedney entrance fittings, straps, clamp backs, etc., you get an *entire* conduit system with hot dip galvanized finish.



TYPE FS—Threaded—shallow bodies for heavy wall rigid conduit. Only Gedney gives you hot dip galvanized as standard finish . . . no corrosive deposits on threads to slow down work and hike costs.

NO MATTER WHAT your requirements may be, there's always the right Gedney body and fitting for the job. To cut installation time and costs and assure long-run dependability, specify Gedney, always.

GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

PENNSYLVANIA Pole

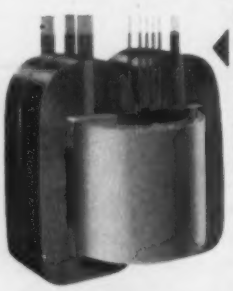
pt

PENNSYLVANIA POLE STAR TRANSFORMER

The Lapped Core Makes the Difference

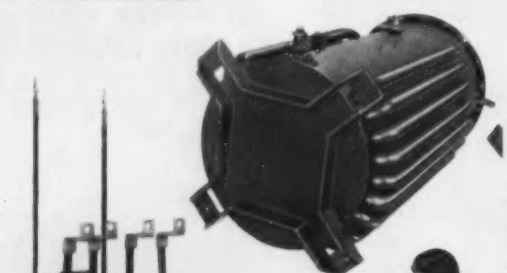
The patented design of the Pole Star Core enables Pennsylvania to build Pole Star Transformers through the entire range of EEI-Nema distribution sizes, from 3 Kva through 500 Kva, and from 480 Volts through 67,000 Volts. The Pole Star takes full advantage of the high permeability and low loss characteristics of the oriented electrical steel used in making the lapped core. This results in a core with low exciting current and low core loss. In every voltage rating, the Pole Star is lighter in weight and smaller in size than the stacked core transformer it replaces. The Pole Star is economical to operate and easy to install. *In short, the Pole Star is an Outstanding Product . . . Operating with Great Efficiency at Low Cost.*

100 Kva



LOW CORE LOSS—AN OUTSTANDING FEATURE OF THE POLE STAR

Pole Star cores are carefully annealed in controlled-atmosphere furnaces, but do not suffer the disadvantages of adhesions. That is because when the core is assembled through the coil, the laminations are separated from each other. The absence of adhesions between laminations and the presence of high interlamination resistance keep the core loss at a low value.

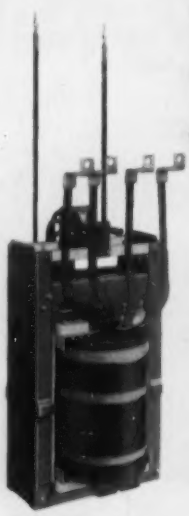


NEW BASE FEATURES CROSS VENTILATION

Structural steel bars are welded to the tank bottom. Their arrangement permits the transformer to be rolled in any direction. Jack lugs extend beyond the tubes or radiators. Openings provide cross ventilation for the tank bottom and the base. The entire tank bottom is accessible through the openings for painting.

INTERNAL ASSEMBLY OF 167 KVA POLE STAR

Side frames completely enclose the core and provide a sturdy support for the entire unit. The Pole Star coil is designed for a low temperature gradient and a high overload capacity. Large oil ducts are provided in the coil to permit a free flow of oil through the coil. High voltage and low voltage windings are properly balanced to minimize the effects of short circuits.



CORE BUILDER ASSEMBLES LAMINATIONS THROUGH 500 KVA POLE STAR COIL

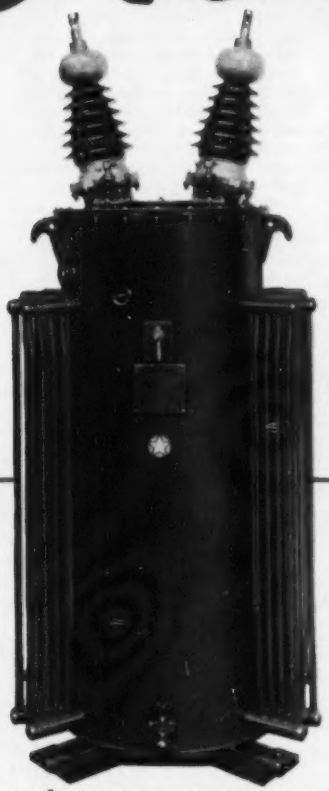
Core laminations are individually lapped. There are no gaps or butt joints in the Pole Star core to cancel out the advantages of the cold-reduced, oriented electrical steel. The lapped construction reduces the flux density at the joint and maintains the low reluctance path of the Pole Star core.

Star TRANSFORMERS

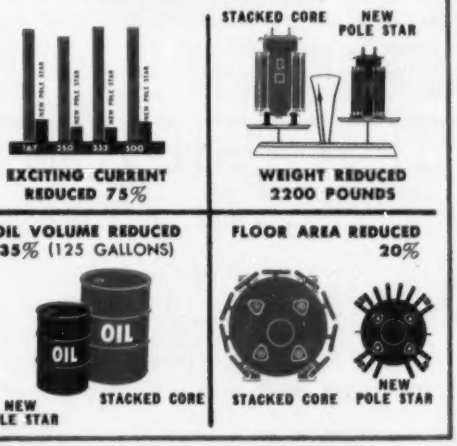
in sizes

3 Kva through 500 Kva

480 Volts through 67,000 Volts



Compare THE NEW 500 Kva POLE STAR WITH THE OLD 500 Kva STACKED CORE TRANSFORMER



1 YOU WILL GET BETTER PERFORMANCE *Because* Pole Star transformers have a reduced core loss and therefore operate at higher efficiency. The Pole Star core uses to best advantage the superior magnetic qualities of cold-reduced oriented electrical silicon steel.

2 YOU WILL GET BETTER VOLTAGE REGULATION *Because* Impedances have been reduced. Better customer relations will result since lower impedances mean less voltage fluctuation during load changes, and less voltage drop during peak loads.

3 YOU WILL SAVE MONEY *Because* Pole Star transformers have lower exciting current — *the current needed to magnetize or excite the core.* Since it is always present — under *any load* or *no load* conditions — a certain amount of generating Kva must be earmarked for exciting current and nothing else. In terms of hundreds of transformers, this generating Kva can mount up to large amounts of generating capacity, supplying nothing but exciting current and returning no revenue to the utility.

It is good business, therefore, to install Pole Star transformers on *your* lines. Under *no load,* less generating capacity would be required. At *full load,* the utility will derive more output per unit of generating capacity. By installing Pole Star transformers with low exciting current, real dollar savings can be achieved.

4 YOU WILL BE USING SMALLER TRANSFORMERS *Because* Pole Star transformers from 167 Kva through 500 Kva are as much as 28% lighter and 30% smaller in size. This means you will get *more Kva per pound* when you install Pole Star transformers on your lines. It further means that when you must replace your old transformers because of heavier loads, you can install larger Kva-rated Pole Stars with little or no increase in size or weight.

PENNSYLVANIA
TRANSFORMER COMPANY

A McGraw Electric Company Division

CANONSBURG, PA. • *Greater Pittsburgh District*

TRI-STATE SUPPLY CORPORATIONS

TOPS IN TAPES

America's Top Brands
Class A, B and H

SCOTCH
Electrical Adhesive Tapes

Complete line—crepe and flat-back paper, plastic, acetate film, polyester film, fabric, neoprene, Fiberglas. There's a pressure sensitive tape for every manufacturing and maintenance job...and TRI-STATE HAS IT!

ELECTRO
Insulating Tapes

Varnished Fiberglas, asbestos, and silicone treated tapes, including the new *BI-GLASS*—the only bias woven, varnished glass tape that *stretches*. *SILBESTOS*—silicone treated Fiberglas combined with inorganic asbestos powder. *SIL-MIC-GLAS*—a flexible, hi dielectric-hi temperature tape made with mica imbedded in Fiberglas cloth.

For the nation's finest electrical, electronic, and industrial supplies, make

ONE CALL FOR ALL TOP BRANDS

TRI-STATE
SUPPLY CORPORATIONS

LOS ANGELES 13 • 544 South San Pedro St
MUtual 2354

SAN FRANCISCO 7 • 544 Bryant Street
EXbrook 2-8890

SEATTLE 4 • 318 Occidental Avenue
Main 4161

(40) FOR HAZARDOUS LOCATIONS — Crouse-Hinds 1954 edition of "Conduiets for Hazardous Locations" contains a table listing commercial uses of hazardous substances, their flash points and ignition temperatures; articles 500 and 510 of the 1953 NECode; detailed descriptions of explosion-proof and dust-tight electrical equipment conforming to these articles. This bulletin 2655 may be secured from Crouse-Hinds Co., Seventh North St., Syracuse, N. Y. Title or function should be stated with request.

(41) DISTRIBUTION TRANSFORMERS—How to distribute secondary loads and temporary overloads economically with its type ACPB transformers is told by Allis-Chalmers, 939 S. 70th St., Milwaukee, Wis., in bulletin 61B8054. The bulletin shows how secondary banking improves service by connecting transformer capacity so that temporary overloads are distributed among two or more transformers.

(42) IMPACTS — Facts necessary to design products as impact extrusions are covered in a bulletin from Aluminum Co. of America, 724 Alcoa Bldg., Pittsburgh 19, Pa. These impacts are one-piece, seamless, semi-hollow or solid parts having forged bases and one or more extruded side walls.

(43) SWITCHES — Automatic transfer switches and factors to look for in selecting them are covered in publication 502 from Automatic Switch Co., Orange, N. J.

(44) RELAYS — Various types of open and hermetically sealed a-c and d-c relays are described in bulletin 560A from R-B-M Division, Essex Wire Corp., Logansport, Ind. Requests should be addressed to W. D. Loux.

(45) MODERNIZATION — "Compete or Collapse," is the title of a booklet on electrical modernization in industrial plants offered by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Sections show how a modern electrical system can: (1) increase output; (2) lower operating cost; (3) reduce down time and maintenance; (4) increase safety and reduce safety protective rates. The booklet is designated B-6133.

(46) GUIDE—Providing in condensed form necessary information on the new method of calculating horsepower capacity of a Texrope V-belt drive, a six-page bulletin released by Allis-Chalmers gives means of determining ratings for both standard construction and high-capacity belts. The ratings resulting from this new method take into consideration effect of belt length, ratio of the diameters of both the driving and driven sheaves upon the horsepower rating of the belt and resultant belt life. This bulletin 20B6956B is available from the manufacturer, 939 S. 70th St., Milwaukee, Wis.

(47) CORDS—A 30-page two-color catalog has been prepared by the Cords Ltd. Division of Essex Wire Corp., 121 Dodge Ave., DeKalb, Ill. The booklet contains engineering drawings of plastic and molded rubber cord connectors, strain reliefs, crotholes and cockets. Simplified tables give maximum ampere and voltage ratings for various portable cordage and wire gages with typical appliance and industrial cordage and cord sets listed.

(48) TROLLEY BUSWAY — Feedrail Corp., 125 Barclay St., New York 7, N. Y., describes its trolley busway system of electrification in bulletin 40.

(49) CONTROL—In a new 16-page booklet, General Electric Co. uses photographs, charts and diagrams to explain operation and application of its Limitamp high-voltage motor control. The two-color publication is designated GEA-5409; is available from G-E at Schenectady 5, N. Y.

(50) FLOODLIGHTS—Steber Mfg. Co., Broadview, Ill., has issued catalog No. 127-53 on its improved Series 4000 sports and industrial floodlights. Floodlights are designed for PS-52, 750- to 1,500-w lamps and can be supplied also with special sockets to accommodate bi-post lamps.

KILL TWO BIRDS WITH ONE STONE—Fill out this one coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after August 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

If described in advertising, fill in page number

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NAME..... TITLE.....

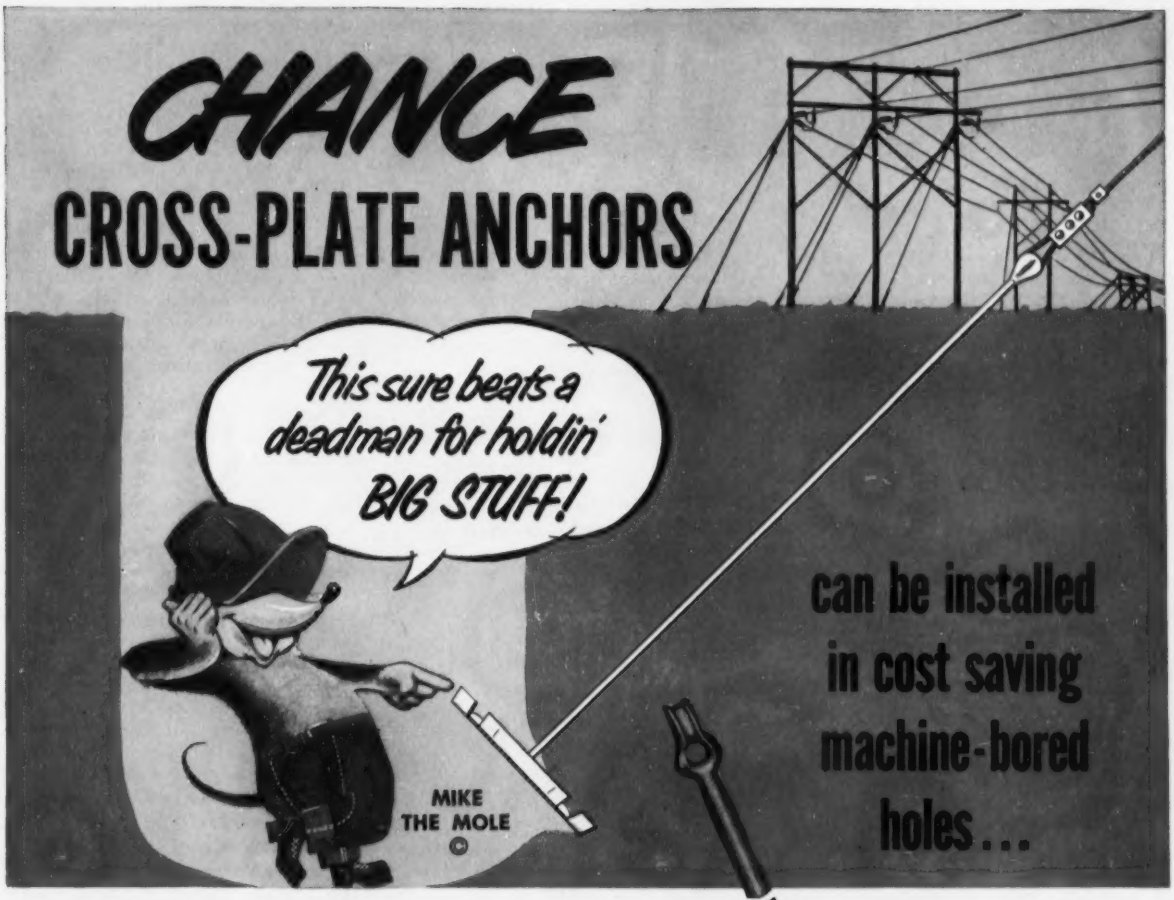
COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

CHANCE
CROSS-PLATE ANCHORS



Give the Guy a CHANCE

When you're guying "big stuff," like transmission lines, you want an anchor that will hold the load for the life of the line. Not only will a CHANCE Cross-Plate Anchor stay put under really heavy loads, it will enable your company to cut installation costs in half.

In a typical test conducted under laboratory conditions, a CHANCE Cross-Plate Anchor held a load of 70,000 pounds with only a slight distortion, while the maximum load reached before a creosoted log began to split was only 20,000 pounds.

With the CHANCE Cross-Plate Anchor, whether you bore vertically or diagonally—*only one* hole is necessary ... and *all* the boring can be done by machine. Log deadmen require a trench—and digging a trench takes *hours* of manpower. You also save truck and storage space. One man can handle two Cross-Plates, but it takes two to handle a deadman ... so save your company time, labor and dollars. Use CHANCE Cross-Plate Anchors on your "big stuff."

Nut retainer prevents the anchor from riding up the rod as it is placed in the hole.

A·B·CHANCE CO.
CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

CHANCE Cross-Plates are available in a range of sizes from 150 to 400 square inches. There is a CHANCE Anchor Distributor near you who can probably fill your order directly from stock.

SPECIFY CHANCE FOR SERVICE!

CA54-15

ELECTRA'S HUSBAND

WHAT follows is Electra's suggestion. She has been listening to some hot discussions about the forthcoming elections. Some of our friends are worried about the senatorial fight in Oregon. Others think the fate of the Eisenhower Administration will be determined by how the folks at home vote for Congress.

Electra happened to hear radio commentator Bill Henry (who also writes for the Los Angeles *Times*) talk about this subject so she wrote for his script. She gave it to me the other evening with this admonition:

"Tell all of your friends who want to see a businesslike, honest administration continued in Washington to read this."

So here it is:

"There is some reason to doubt," the man said, "if it is possible for a purely nonpolitical, businesslike administration to survive in this country—we'll find out the answer at the November elections."

The Test—The man was quite serious. He is an old Washington hand, experienced in the ways of politicians. He is a Republican. He believes that the Eisenhower administration is the best equipped from the standpoint of ability in the history of the United States—but that it is also the worst equipped politically. Eisenhower, he thinks, not only is politically naive but is also so constituted that even if he knew the politically smart thing to do he wouldn't do it, because he disdains stooping to that level. He has surrounded himself with men of similar ideas and ideals. This man says that it isn't the Eisenhower administration which will be tested this November—it will be the American people. Is the American voter smart enough to know class and quality when he sees it?

Attitude—"The trouble with the people in this administration," the man said, "is that these fellows have been trained in business rather than in politics. When a man heads a big business concern he doesn't bother to hire a personal press agent—he lets his ability speak for itself. He figures that if he does a good job of running his business that fact will show up on the books of the company and the stockholders will have sense enough to appreciate it. He doesn't start out by promising the stockholders everything at the beginning, nor does he keep calling their attention to every move he makes in their behalf—he takes it for granted that they trust him to do a good job. He doesn't bother to sell himself."

Administration—"Now you take this administration," he continued. "They took over after a generation of political patchwork by the Democrats with whom life was just one emergency after another and legislation was nothing but temporizing. The Democrats never stood off and took a long look at the country and, after analysis and deliberation, proposed a whole new plan. That's what the Eisenhower administration has done. The Republicans have taken over the government which was losing money right and left and going into a hole year after year and have acted the way smart new management takes over a bankrupt concern—they've found out what was wrong, figured out a remedy which will put the concern back on its feet, and are now trying to put that remedy into effect."

SALES JOB IS MISSING

Difference—He was pretty worked up about it. "Now, that's all very well," he said, "if the interested parties—in this case, the voters—understand and appreciate it. The trouble is that the Republicans haven't done a good job of selling. They are a lot of excellent, but staid, individuals who are utterly without showmanship. Roosevelt was the showboat type—a real salesman. He could, and did, give the American people candy when what they needed was medicine. Everybody likes candy. You have to be mature to be willing to take medicine. Truman was, in a different way, the showboat type too. And he had a collection of patent-medicine salesmen in his administration. They were all good and ready speakers—spent more time telling the voters what they were doing than they did actually doing it. Who is telling the voters what the Eisenhower administration is doing? Nobody!"

Prospects—He shook his head. "Maybe the Eisenhower virtue-is-its-own-reward policy will work. I know Eisenhower. He believes in first things first. He believes in the intelligence of the voters. He thinks that the American people are smart enough to understand and appreciate what good, alert, smart, up-to-date management can do for this country and that no salesmanship is needed. That's a noble belief and you have to respect a man for it. And, maybe he's right! Who knows? Well, we'll find out come next November!"

Even Electra thinks that there has been no real sales job from Washington. She recalls that, before our junior senator became vice-president, he sent out a periodic letter to his constituents telling them about Washington developments. The letter was intimate, newsy and highly readable. A few congressmen do the same sort of thing. But the top level sales job is missing.

It's too bad. One Washington observer, Virgil Pinkley, who is also a newspaperman and radio commentator remarked the other day that there is an inspiring atmosphere of dedication and responsibility in the national capital. He said it is inspiring because it is so different. He said also that a lot of the waste and inefficiency has been cleaned out. Many of the men in positions of high trust and responsibility have made great personal sacrifices in joining the administration.

Unfortunately, there just aren't any sales and promotion-minded people helping to get that story across to the voters. The "virtue-is-its-own-reward" policy that Bill Henry's friend speaks about is fine up to a point but only up to a point. And after that it needs somebody to tell it and sell it.

Electra seems to think that unless the selling starts soon there will be a decided change in Washington climate—for the worse.

ALLIS-CHALMERS

PROGRESS IN Switchgear

Here's Basic Difference in Operators

ALLIS-CHALMERS uses simple uncoupling linkage for fully mechanically trip-free operation

Take the case of a high speed reopening following "closing-in" on a system fault. That's really the test! With Allis-Chalmers mechanism, air or oil pressure need not be dumped to permit opening. Trip coil releases a latch and the simple closing linkages uncouple, allowing contacts to open at full speed — regardless of the position or condition of the closing mechanism. That's fully mechanically trip-free operation!

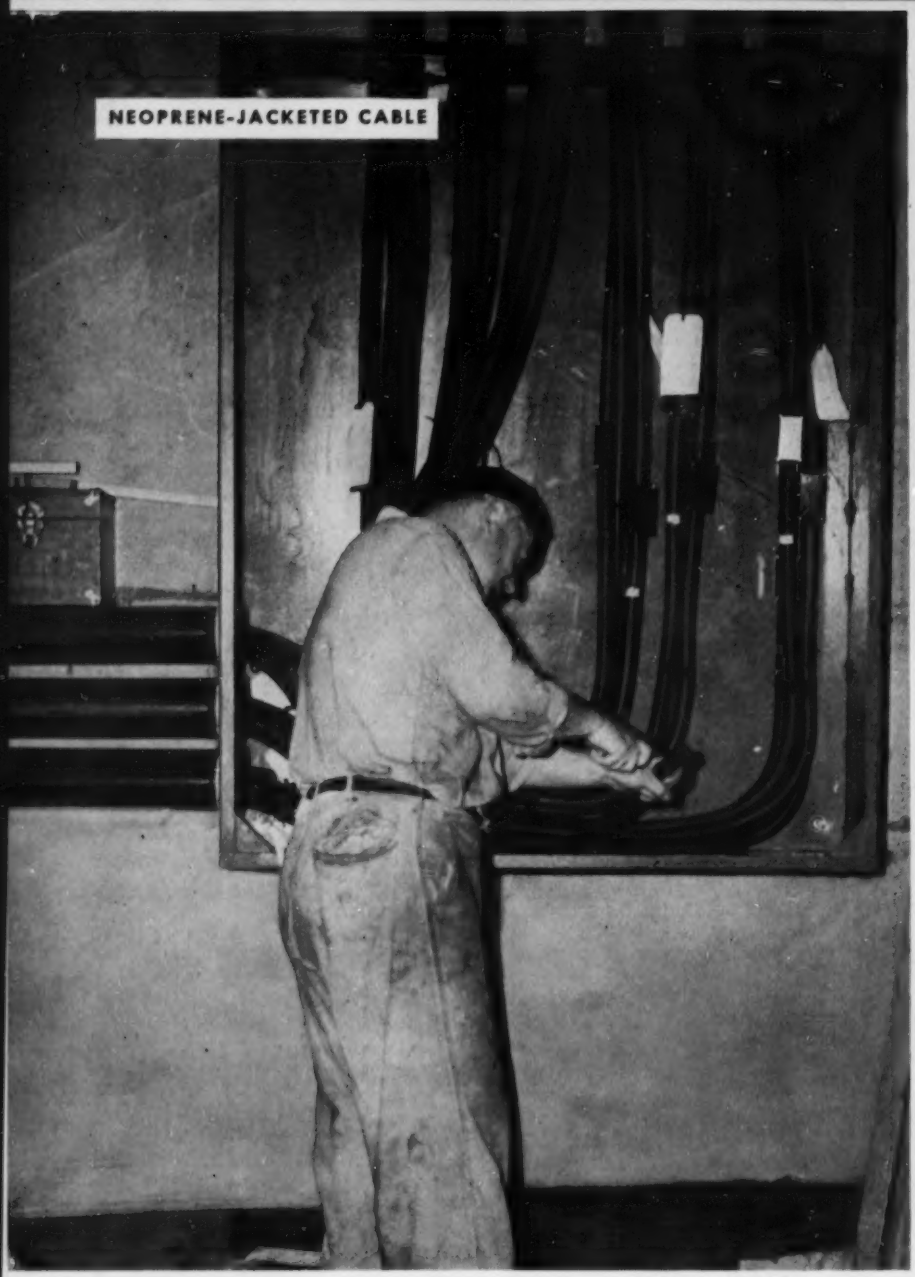
Non-mechanically trip-free mechanisms require dumping of air or oil pressure so that contacts can open. To do, this takes a whole sequence of devices, including valves and solenoids. Everything must work perfectly, or breaker will be held closed or slowed in opening.

This truly simple operator principle has been a feature of Allis-Chalmers breakers since 1933. For further details call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4391

A-C ALLIS-CHALMERS

ALLIS-CHALMERS



. . . FOR PLANTS

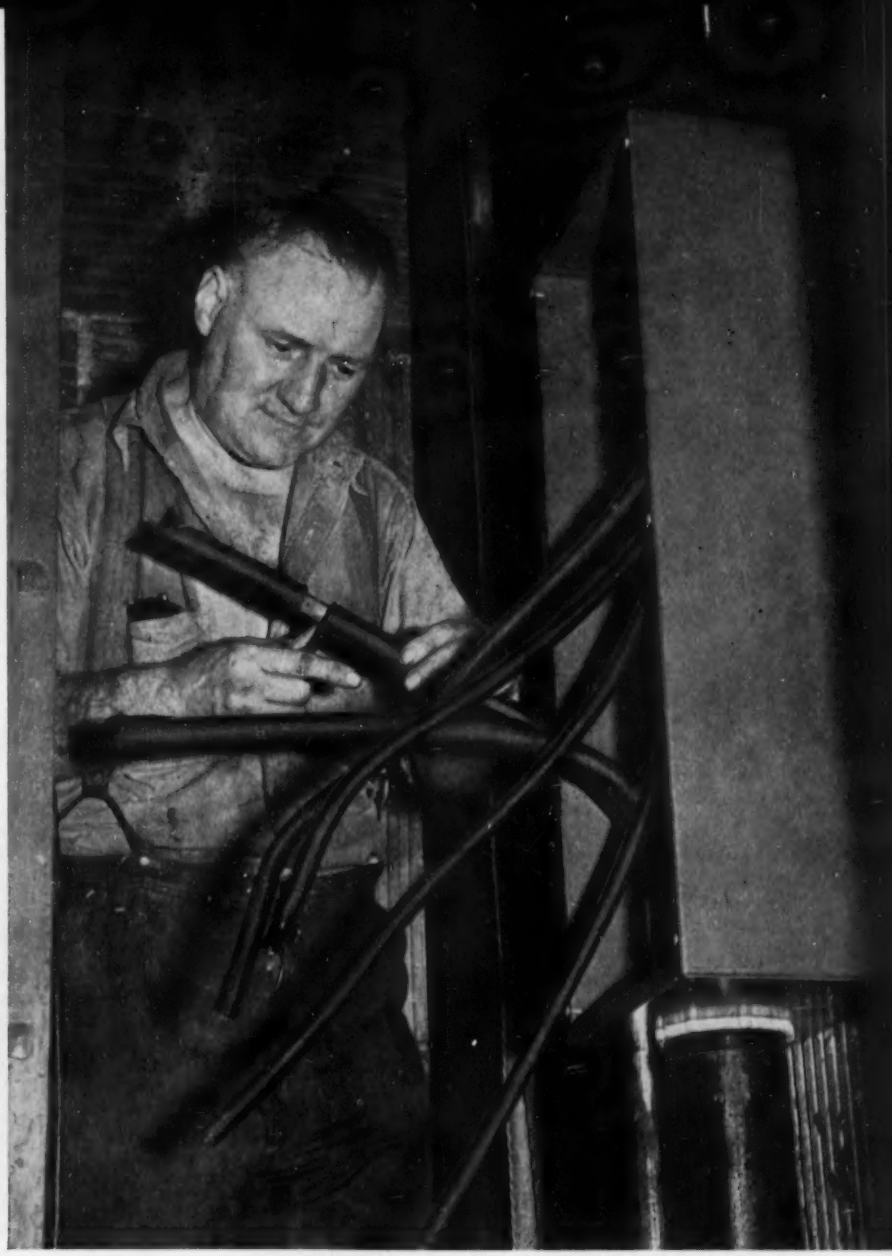
How to get premium wiring for little more

The cable to use is DURASHEATH.
Its actual over-all cost is so little more than the cheapest cable

Wait! Before you buy cable on price alone, see how *little* a premium wiring job actually costs. And what good insurance it is!

When you're wiring up, for power or lighting, the price of wire and cable is but a *fraction* of the over-all cost. Simple arithmetic follows – *it makes very little difference in the total cost of the job* whether you buy

. . . FOR UTILITIES



. . . FOR COMMERCIAL BUILDINGS

than you now pay

the cheapest cable or a premium cable like neoprene-jacketed Durasheath*.

But what a difference there can be in performance!

Anaconda's Durasheath is tough . . . heat-resistant . . . long-lasting. Its rugged neoprene jacket resists moisture, chemicals, sunlight, corrosion, electrolysis, abrasion and mechanical injury. It delivers real service dependability year after year.

And Durasheath is good for almost any job you have. You can bury it directly in the ground . . . run it in damp ducts . . . string it overhead . . . in *one continuous run* with minimum splicing. Order through your Anaconda Sales Office or distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off.

54366

ANACONDA®

Primary and secondary distribution cable • building wire • portable cords and cables • mine cable • magnet wire • copper, aluminum, copperweld conductors • signal, control and communication wire • wire and cable accessories.

QUICK SERVICE FOR GROWING WEST — *Anaconda's integrated plant at Orange, California, assures western industry of quick, sure service on wire and cable for every kind of application. Contact Anaconda Sales Office at: Los Angeles, San Francisco, or Seattle.*

SILENCE

is the symbol of their excellence!

What does it take to make a *quiet* dry-type transformer?

Working with sound measuring equipment in their own anechoic chamber, Burton Equipment Co. Engineers found the answer.

Noise can be held to a minimum by carefully assembling the best materials available. Any compromise with quality, any carelessness in assembly is likely to cause noise. The secret is as simple as that.

Technicians at the Burton Equipment Co. are trained to take special care in cutting and stacking core laminations. The best grade of iron is used, with each leg having exactly the same number of pieces. This prevents flux non-uniformity and resultant lamination rattle. Cases, mounting, hardware are designed and constructed to avoid resonance.

All Burton Quiet-Quality Transformers have a lower noise level than that required by ASA and NEMA standards. Burton XQ—Extra-Quiet-Quality Transformers are as quiet as the standard for liquid filled types. Both QQ and XQ lines are available in all standard voltages—5 through 1000 kva.

XQ, *extra-quiet-quality*, BURTON TRANSFORMERS *are guaranteed to be 10 db quieter than ASA and NEMA standards!*

Extra-Quiet-Quality models solve school and hospital power distribution problems easily, positively, inexpensively.

BURTON EQUIPMENT CO., INC.

4810 Firestone Boulevard, Box 681, South Gate, California

Telephone: LOgan 8-3151

LETTERS TO THE EDITOR

Want Ad Helped

To the Editor:

We have been informed that the EEI-NEMA joint committee on standards for distribution transformers met in Chicago on Monday and Tuesday and approved a new standard for 7,200-v transformers *without taps.*

The truth in the statement, "It pays to advertise," has been proved. There is no doubt that the "Want Ad" that appeared in ELECTRICAL WEST last November was the motivating influence which stimulated the thinking of the need for a *real basic* 7,200-v transformer.

Please be assured that the efforts that you and your publication are making on behalf of the improvement of the electrical industry are greatly appreciated. Personally, and on behalf of Portland General Electric Co., the writers wish to thank you for the help that you have given us.

SIDNEY E. CALDWELL
Planning Engineer

E. ALLEN PAINE
Assistant Superintendent of Distribution

Portland General Electric Co.

How About Policy Control?

To the Editor:

Your editorial in the March issue entitled "Unfair Statement" accuses Senator Kefauver of making a most unfair statement in his claim that the Idaho Power Co. is a New England concern having few if any stockholders west of the Hudson River. You support your accusation by stating that only 15% of the company's stockholders live in New England, while 60% live in 11 Western states with 40% actually residents of Idaho and Oregon.

If your figures are correct, then Senator Kefauver is mistaken . . . However, as you well know, your figures on the distribution of stockholders are alone not the figures or facts on which to judge Senator Kefauver's claim that Idaho Power is a New England concern. What is of importance here is who really controls the policies . . . by what means do they control it and how does their control relate to the proper conservation and development of Northwest resources for the greatest general public welfare. If the policies of the Idaho Power Co. are controlled by holders by voting stock, then it is the distribution of these shares among the stockholders that determines the home of controlling interests and not solely the distribution of stockholders throughout the nation.

If you wish to be fair in your statements then you will print another editorial giving these figures on share distribution and the facts of policy control . . . I am certain that true figures and facts will show Idaho Power to be controlled by eastern interests with only token representation in the Northwest.

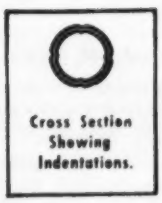
From my point of view, however, it should not help Idaho Power's case one bit in the controversy over Hells Canyon even if it were solely an Idaho firm with all its

(Continued on Page 74)

USED THE MOST FROM COAST TO COAST

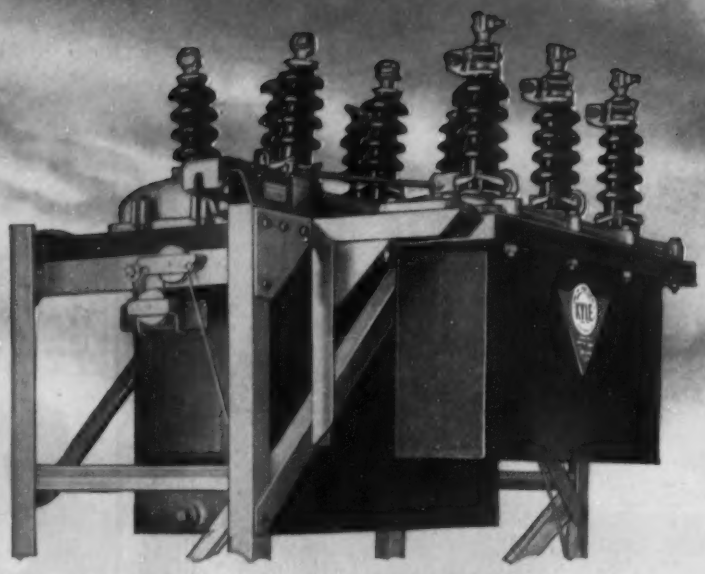
For many years Contractors from Coast to Coast have used Briegel All Steel Indenter Fittings. U. L. approved as concretetight and for general use, B-M Indenter Fittings are faster, easier to use and neater in appearance.

Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!



BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!



Kyle Type R three-phase recloser; designed for substations up to 100,000 kva symmetrical fault current and heavily loaded feeders. Available with ground fault tripping and accessories for a wide variety of applications.

Kyle Type L single-phase heavy-duty recloser; provides interrupting capacities up to 6000 amperes at 4.8 kv, 4000 at 14.4. A big recloser with oil cross-blast arc extinction, choice of four time-current curves and ten operating sequences.

Complete Coordinated Automatic Protection from Substation to Load

Distribution Class Nominal Rating 14.4 kv BIL 95 kv			Intermediate Duty Nominal Rating 23 kv BIL 150				Heavy-Duty Nominal Rating 14.4 kv BIL 110 kv			
Single-Phase Type H Three-Phase Type 3H			Single-Phase Type E Three-Phase +				Single-Phase Type L Three-Phase Type R			
Rating Amps.	Min. Trip Amps.	Inter. Rating* 14.4 kv	Rating Amps.	Min. Trip Amps.	Inter. Ratings* RMS Amperes 14.4 kv	23 kv	Rating Amps.	Min. Trip Amps.	Inter. Ratings* RMS Amperes 4.8 kv	14.4 kv
5	10	125	5	10	200	125	....	....	....	....
10	20	250	10	20	400	250	....	....	....	....
15	30	375	15	30	600	375	....	....	....	....
25	50	625	25	50	1000	625	25	50	1500	1500
35	70	875	35	70	1400	875	35	70	2100	2100
50	100	1250	50	100	2000	1250	50	100	3000	3000
....	....	....	70	140	2500	1750	70	140	4200	4000
....	....	....	100	200	2500	1750	100	200	6000	4000
....	....	....	....	....	....	....	140	280	6000	4000
....	....	....	....	....	....	....	#160	320	6000	4000
....	....	....	....	....	....	....	#185	370	6000	4000
....	....	....	....	....	....	....	**200	400	6000	4000
....	....	....	....	....	....	....	#225	450	6000	4000
....	....	....	....	....	....	....	#280	560	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X/R ratio of not less than 8, and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

#Available in three-phase Type R only. **Available in single-phase Type L only.

+Electrical interconnection available to give three-phase lockout.

For Ground Fault Tripping: Type R heavy-duty three-phase recloser is available with built-in ground trip solenoid and auxiliary current transformer. Type 3H is available with a shunt lockout coil which may be used for ground fault tripping with suitable auxiliary equipment.

Get the Facts on Complete Coordinated Automatic Protection

The L-M Field Engineer can help you with your protection problems. Discuss them with him—you'll find his advice helpful. Or write for information and bulletins. Kyle Products Division, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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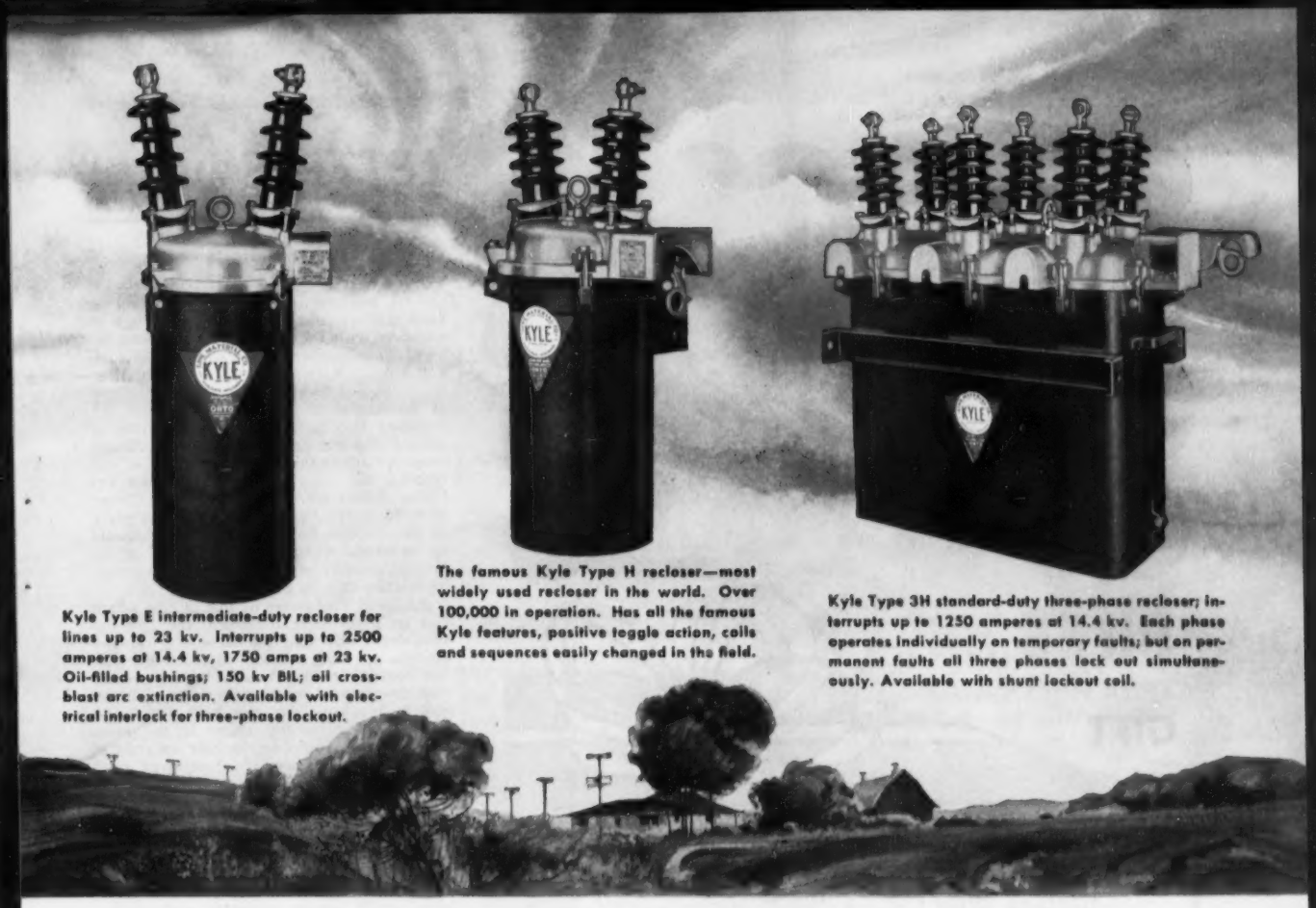
Compare What L-M Offers

Note the complete range of protection L-M offers in Kyle reclosers, compared with that offered by other companies.

SINGLE-PHASE						
Duty	L-M	Co. A	Co. B	Co. C	Co. D	Co. E
Light	yes	no	yes	yes	yes	no
Intermediate	yes	no	yes	yes	no	yes
Heavy	yes	no	no	no	no	no
23 kv	yes	no	no	no	no	no
Sectionalizer	yes	no	yes	no	yes	no

THREE-PHASE						
Light	yes	yes	no	yes	yes	no
Intermediate	yes	yes	yes	yes	no	no
Heavy	yes	no	no	no	no	no
23 kv	yes	no	no	no	no	no



Kyle Type E intermediate-duty recloser for lines up to 23 kv. Interrupts up to 2500 amperes at 14.4 kv, 1750 amps at 23 kv. Oil-filled bushings; 150 kv BIL; oil cross-blast arc extinction. Available with electrical interlock for three-phase lockout.

The famous Kyle Type H recloser—most widely used recloser in the world. Over 100,000 in operation. Has all the famous Kyle features, positive toggle action, coils and sequences easily changed in the field.

Kyle Type 3H standard-duty three-phase recloser; interrupts up to 1250 amperes at 14.4 kv. Each phase operates individually on temporary faults; but on permanent faults all three phases lock out simultaneously. Available with shunt lockout coil.

Only L-M Offers Complete Coordinated Protection from Substation to Load

by **R. C. KIRK**
Manager
Kyle Products Sales
Line Material Company

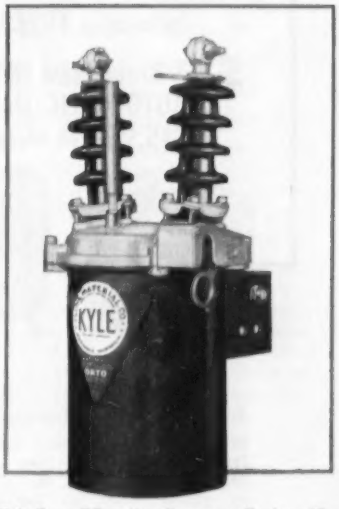
Utilities have done an outstanding job of rendering continuity of service to their customers, many times under extremely adverse conditions. But the growing cost of service continuity is a serious problem for the distribution engineer.

To help alleviate this problem, L-M makes available a complete, coordinated system of automatic protection. Reclosers are available that meet widely varying requirements, from those of a good-sized substation and heavily loaded feeders down to the smallest section. Automatic sectionalizers coordinated with the reclosers help eliminate faults, or will cut off one section without interrupting service on an entire area.

Complete automatic protection eliminates from 50 to 95% of the outages, utility experience shows. Service trips for replacing fuses are greatly reduced. Revenue is increased and costs can be cut appreciably.

L-M was a leader in developing the completely automatic, dependable hydraulic timing system. L-M introduced dual timing in Kyle reclosers; L-M has pioneered in recloser development and has been the leader in the number of reclosers in use. Kyle reclosers offer the widest choice of time-current curves and operating sequences. And only L-M offers the fully coordinated series of reclosers and sectionalizers that permits complete automatic protection.

The design of Kyle reclosers and sectionalizers has been thoroughly tested and fully proved by extensive field experience. Because L-M makes more reclosers than any other company, L-M engineers have more experience, more data on which to provide Kyle Recloser Application Service. 181



Kyle Type GS sectionalizer; coordinates with reclosers to clear temporary faults on branch lines. If faults are permanent, sectionalizer locks out, permits the recloser to restore service on other lines.

LINE MATERIAL Kyle® Reclosers

MR. JOBBER! MR. DEALER!
Celebrate our
Silver Anniversary of Electric Heating . . . and
1,500,000
Fan-GLO HEETAIRES

FREE...
your party
GIFT

1. A MARKEL-MAID WARMETTE FREE... $6.95 List Price . . . with every $109.90 Heetaire Order!
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See Your Jobber Now . . . he's ready with his new stock, free WARMETTES, free displays, free literature, etc. . . . or please write us for the details!

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148 SENECA, BUFFALO 3, N. Y.

LETTERS

Starts on Page 70

owners residing in Idaho, except that in such case its policies might be more apt to coincide with the best interests of the region. The number of stockholders in such a company is but a handful compared to the total population of the Northwest and of the nation.

Since the potential contribution of proper resource development in the Northwest can affect the lives of so many of our citizens, the issue of whether or not the Idaho Power Co. should be given license to build their proposed three dams in place of the federal Hells Canyon Dam should be determined by the interests of a far greater number of people than the number of stockholders in a company.

I believe that issues of this nature which can set precedents in natural resource development affecting the lives of so many citizens are only properly decided through our constitutional guarantee of representative government by placing these issues on ballots for vote. In this way legislation which is enacted by many is the most likely means of serving the best interests of many. This likelihood is dependent to a large degree on how well the voters are informed of the many factors relating to the issue.

. . . If Idaho Power were sincerely concerned about regional development and alleviating a power shortage they would be applying to build dams at many sites available which would integrate with rather than conflict with the key multipurpose site available on the Snake River . . . Idaho Power is under no commitment to build all three dams they propose as a satisfactory alternate to the high federal dam even if granted the license. Assuming, however, that they build all three, it would still be very dubious how much contribution they would make to the Northwest's power needs because of the company's high rates and continued opposition to any major electrical intertie with the Northwest power grid. Furthermore, if one is acquainted with the nature of engineering studies and cost estimates upon which the government bases its proposal . . . I believe it is then a farce to claim that Idaho Pawer's proposal is a match for the potentialities of the federally proposed Hells Canyon Dam.

ROBERT J. THOMAS
Portland, Ore.

Congratulations

To the Editor:

My attention was called yesterday to the article describing the high current transformer* . . . Naturally, one of my first moves this morning was to go to our library and look at the article in print.

Please accept my congratulations. You and your editorial staff have done a magnificent job in setting it up.

I am interested in knowing how some copies of the article may be obtained.

R. W. SORENSEN
Professor of Electrical Engineering
Emeritus
California Institute of Technology
Pasadena

* "Extra High Current Tests Now Possible," May 1954, p 76.

Compare your savings with these Kaiser Aluminum conductors:

	Per 1000 Ft. Lbs.	Cost
#6 Solid Copper TBWP*	112	$ 46.73
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#4 Solid Alum Neo (3/64)	64	26.50
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2/0 7 Strand Copper TBWP*	522	204.99
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4/0 7 Strand Alum Neo (4/64)	306	136.00
4/0 7 Strand Copper TBWP*	800	312.56
336400 CM, 19 Str. Alum PE (4/64)	388	213.00
336400 CM, 19 Str. Alum Neo (5/64)	469	228.00

Mar. 17, 1954 prices based on 30,000#—F.O.B. Destination
*URC Copper Triple Braid Weatherproof

WHY PAY over $.02 for five inches of conductor you never get?

Why not *get* that missing five inches by specifying Kaiser Aluminum conductor instead of copper! When you do:

(1) You can string far *more line* for the same amount of money, or

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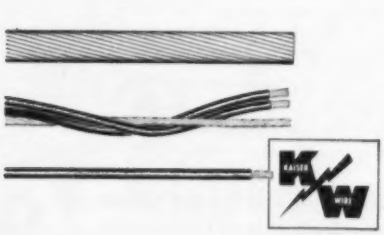
Remember . . . *all* types of Kaiser Aluminum covered conductor give you big savings over covered copper conductor of equivalent current-carrying capacity. These savings add up to thousands of dollars a year!

Let Kaiser Aluminum help you convert to aluminum easily, efficiently, economically—as hundreds of power companies are doing! Complete field, engineering, and laboratory services available at no obligation. Contact any Kaiser Aluminum office in principal cities, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Office*, Kaiser Bldg., Oakland 12, Calif.



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Prepared for trouble?

You don't have to be armed to the teeth to avoid communications trouble. Not when your communications are supplied by the Bell System.

A planned program of preventive maintenance is an important part of Bell System service. Its purpose is to prevent interruptions in service.

In the laboratory, technicians are continually developing new and more efficient equipment. In the field, Long Lines plant and commercial experts frequently visit critical points of your communications system to observe conditions and to improve operations.

Alternate routings are an integral part of planning by telephone engineers to protect your service.

The entire program is backed by the Bell System's 78 years of communications experience.

We supply the power industry with reliable private-line telephone, mobile telephone and teletypewriter service, and channels for remote metering and supervisory control.

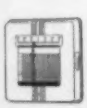
• • •

Your Bell Telephone Company will be glad to study your communications problems and needs.

PRIVATE-LINE TELEPHONE

TELETYPEWRITER

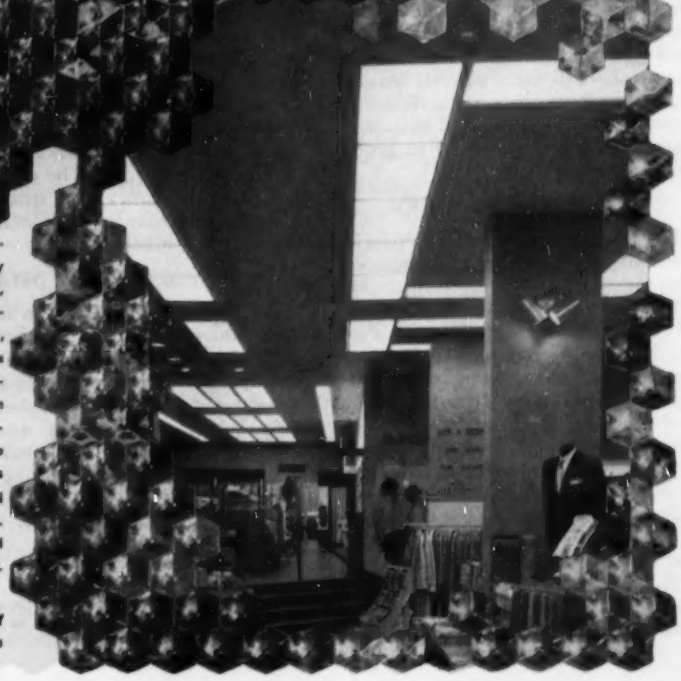
MOBILE TELEPHONE


METERING CHANNELS

BELL TELEPHONE SYSTEM

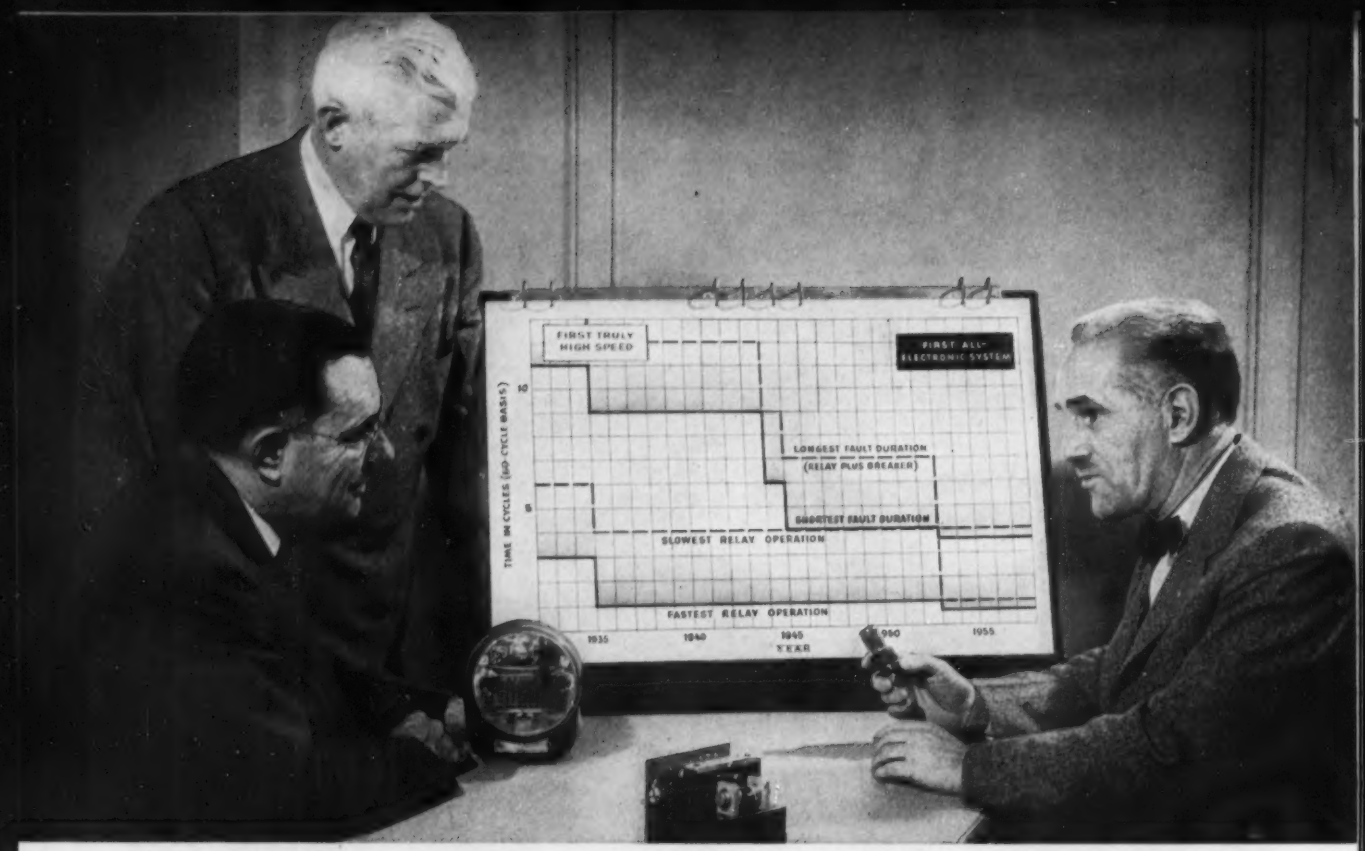
SUNBEAM visionaire LIGHTING PRODUCTS

NEW LIGHT PATTERNS FOR SMART INTERIORS



"Howard's" of San Francisco, recently remodeled, clearly shows how efficiently and smartly stores may be lighted with Sunbeam's new, "large area" recessed #3600 fixtures. Especially adaptable to various geometric patterns, these 2x4-foot units are available with various light diffusers. Groups of nine units with crystal-clear, low brightness lens panels, pattern #70, in a skylight effect, provide 200 foot-candles of sales-producing illumination in the sportswear department. This high intensity is achieved with remarkable low brightness and minimum glare from normal viewing angles. Rectangular patterns of 32° louver-shielded units installed in other areas giving 75 ft-c.

SUNBEAM LIGHTING COMPANY
777 E. 14th Place, Los Angeles 21, California



FASTER FAULT CLEARING as shown by the chart becomes possible with new relaying system, according to (left to right) W. J. McLachlan, Manager, Electric Utility Engineering; L. F. Kennedy, Manager, System Relaying, and R. E. Cordray, Manager, Relay Engineering—all of General Electric.

WORLD'S FIRST ALL-ELECTRONIC RELAYING BRINGS INCREASED TRANSMISSION RELIABILITY

New ultra high-speed relay cuts fault-clearing time, improves stability

The world's fastest transmission line protective relay—a revolutionary new electronic system capable of ⅜ cycle operation—will assist electric utilities to reduce fault clearance time, improve system stability, and help solve many of the problems met in higher voltage transmission.

DEVELOPED FOR 330 KV

Developed by General Electric for eventual use at 330 kv, this electronic relaying system was proven in tests by American Gas & Electric Service Corp. on a 132-kv line of Appalachian Electric Power Co. Higher power levels and greater transmission reliability—important factors in overall system operating economy and future load growth—are more satisfactorily handled due to the reduction in fault-clearing time at which this new relay is designed to function (⅜ cycle after a fault occurs) and consequent reduction in outages and fault damage.

This major development in transmission line relay equipment overcomes the mechanical inertia inherent in electromagnetic devices. Its speed of response is independent of both the magnitude or location of the fault, operating with maximum reliability under all load conditions. Germanium rectifiers and tantalytic capacitors reduce the number of tubes required in the fourteen circuits. The equipment can be used on very long lines where fault currents may be considerably less than normal load current.

WRITE FOR FURTHER DETAILS

To assist electric utilities in meeting the problems of higher voltage transmission and circuit loading, General Electric continues to pioneer in even faster relaying systems, higher-speed reclosing circuit breakers, and other protective devices. For further information on electronic relaying write Section 301-253, General Electric Company, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

FIRST ALL-ELECTRONIC RELAYING system, installed at Reusens Station of the Appalachian Electric Power Company on a 132-kv line in Virginia, functions within ⅜ cycle after fault occurs.

JUNE 1954 Vol. 112, No. 6

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

LIGHT FOR FREEDOM — POWER FOR PROGRESS

LIGHT! The Diamond Jubilee of Light—75 years of electrifying progress! As a giant Sequoia grows from a tiny seed, so our fabulous industry has grown from the glowing of a tiny thread in its first incandescent lamp—the lamp that Thomas Alva Edison brought into being 75 years ago.

More marvelous than the wonders Aladdin evoked from his magic lamp have been those wrought by this industry in these 75 years. Most of this truly phenomenal progress has been made within a lifetime—yes, the lifetime of many of those who read these words. While making history we who lived it did not think of it so. It was but a part of the interest and the fascination this electrical industry has always held for us.

Significantly it was also the history of the West. The two—electricity and the West—have been companions in growth. Electricity was pioneered to convert its deserts and the wilderness to man's use. It was the magic lamp that lighted the way, the Genii with which to power the tasks.

Electricity gave its devotees their own opportunity to grow too. It opened the avenues for those with initiative, those with a spirit of daring and enterprise. Wherever there has been freedom for these qualities to expand, the electrical industry—and they with it—have grown.

Men live history unconscious of it. It is in retrospect that tasks seem formidable. The problems that challenged solution, once surmounted, become in memory the triumphs of record.

Thus many of the triumphs of the electrical industry—even as it was with Edison and the first lamp—are the experience and the accomplishments of many men working together. Our industry associations have been the medium through which this teamwork has been employed in many of our proudest achievements.

The men and women who are the pioneers and leaders today in the industry and its organizations were but the youth of yesteryear. But such is the fascination and the challenge of this great industry—founded by a tiny glow in Edison's first lamp—that they who have grown gray in the service of electricity would willingly exchange places with today's youngest recruit just for the zest of doing it all over again.

This they would do because a dynamic industry such as ours builds both abiding loyalty and a deep sense of satisfaction that comes from accomplishment. Over the years the oldsters have learned something that the younger folk who will take over their places in the ranks have yet to understand. It is that today's difficult and apparently insurmountable problems are but tomorrow's challenge and the next day's opportunities. Edison learned that lesson early and well. From that knowledge he laid the foundation for the electrical industry as we know it today.

So it is appropriate to dedicate this annual Convention-in-Print to the birth of electric light, which in turn gave birth to our great industry. Side by side the people who have built it over the last 75 years have worked together for "light for freedom" and "power for progress." The past has been but preparation for the glorious future.

"The right of an individual or group to develop a hydro resource is as fundamental as is the right to develop coal, oil, gas and mineral resources."

M. M. Koch, President
Rocky Mountain Electrical League

Instead of Federal Power Preference

SPREAD THE BENEFITS EQUALLY

M. M. Koch

IN August 1953 the Secretary of the Interior announced a new federal power policy. Subsequently, power marketing criteria for the Missouri River Basin—eastern and western divisions—were issued which provided more detailed information on how this policy was to be administered. Criteria for the western division were made available about one month later. As issued, there were two fundamental premises in this policy that differed from that enunciated on Jan. 3, 1946, by the then Secretary of the Interior, Harold Ickes. The first premise of the new policy was that the federal government would not assume utility responsibility for the power supply in any given area, thereby leaving this obligation to local interests. The second premise was that preference to the purchase of federally produced power, which is accorded to certain groups of customers, was not a preference in perpetuity but only a preference at the time the power becomes available.

Thus far the Interior Department has not modified its position with respect to the first premise, although it has been subject to severe attack by those who believe that the power business should be a government function rather than a private enterprise. Attacks on this premise have come particularly in connection with the application of the Idaho Power Co. to build three hydroelectric projects on the Snake River and in connection with the five New York companies' proposal to increase the power development at Niagara Falls. Both of these projects are fundamentally power projects, reclamation and flood control not being directly involved.

The position that the Department of the Interior is taking in respect to the federal development of Hells Canyon is consistent with the announced policy of permitting local interests to develop the water power resources of the nation. The claim has been made, however, by the public power proponents that, if the Idaho Power Co. is permitted to utilize the waters of the Snake River for power development, it is a "give-away." The right of an individual or group of individuals to develop a hydro project is just as fundamental in the American way of life as is the right to develop the coal, oil, gas and mineral resources of the country. Instead of being a give-away, the development of these hydro resources by investors creates assets that increase the tax base and consequently the national and local tax revenues, and in addition saves the taxpayers of the nation the many millions of dollars that these projects cost. Only when investors will not take the risk of such developments should these projects be built by the government, and then only when the project is really necessary and is fully justified in the national interest.

The concept that the preference principle is not a preference in perpetuity has been attacked very strenuously, principally on the grounds that since this concept was adopted in 1946 it was not proper for anyone to change it. Prior to 1946 the Interior Department did not incorporate the perpetual preference concept in power sales contracts so, in effect, Mr. Ickes even changed his mind. The perpetual preference concept was incorporated in the Ickes interpretation by means of the withdrawal clause, which in effect said to the customers of the investor-owned utility, "Your electric power supplier may have this power for a while, but must give it back when certain more privileged folks want it." With respect to the marketing of power by the Department of the Interior, the withdrawal feature has appeared only in the Bonneville Act passed in 1937 and has not been incorporated in any other legislation before or since that time. It cannot be said, therefore, that Congress has authorized the application of the perpetual preference concept to all federal power marketing legislation. If that was and is the intent of Congress, it should be clearly spelled out in appropriate legislation.

These federal power projects are financed initially by federal taxes. The largest tax source of the federal governmnt is that of the income tax and it can therefore be said that every income taxpayer, through his individual income tax payments, participates in the costs of these

projects. The taxpayer who is a customer of an investor-owned utility not only contributes to the cost of these projects through his own personal income tax but also through his bills for electric service, since the customer must indirectly pay the taxes levied against the company. Therefore, the customer of the investor-owned utility pays considerably more toward the cost of these projects than does the customer of the electric power supplier whose business is exempt from federal income tax.

When such a project is built, who gets the benefit? Do all of the people living in the area of the project benefit? The preference clause, when construed as a perpetual right, says no, since it says that, if there are any financial benefits that may accrue to the users of federal power, those financial benefits are to be extended eventually only to those people who pay no federal income tax through their power bills. When a federal project is first placed in service, an immediate market for the entire output is obviously necessary if the project is to be self-liquidating in accordance with the pay-out schedule. The government is most happy to have the investor-owned utilities take this power off its hands, but only until such time as those few favored citizens may need it.

Looking at the situation from still another angle, why should the taxpayers living in areas outside of those areas where the federal government has developed power be saddled with the cost of such development? They pay just as much toward its cost relatively as do those customers of the investor-owned utility that happen to live in the area where such power is produced and also more than the customers of the preferred organizations. To eliminate these inequalities, the answer again is that local interests and not the national taxpayer should provide the finances for such development.

When the investor-owned utility purchases power from a federal project, any savings that may be realized through such purchases are passed on to its customers by means of rates approved by the appropriate regulatory authority. These companies cannot earn any return on the federal investment. The cost of this power enters into their cost of doing business and cannot therefore produce extra profits since profits are limited by regulatory authority to a fair return on the company's investment.

A meeting called by representatives of the Department of the Interior was held in Denver on March 9, 1954, for the purpose of discussing the allocation of some 104,000 kw of power made available by virtue of the completion of the Colorado-Big Thompson project. The meeting this day was held primarily for representatives of the investor-owned utilities operating in the North and South Platte basins in Colorado and Wyoming. The Assistant Secretary of the Interior indicated that the policy with respect to the interpretation of the preference clause, namely, preference only at the time the power becomes available, as covered by the marketing criteria issued in September, was to be changed in that no long-term contracts would be made with the investor-owned utilities for the purchase of federally produced power. This, in effect, was to say that the withdrawal features of the previous policy were to continue. Representatives of the investor-owned companies were told that they should look to other sources for their future power supply. The Wyoming companies, who had ceased the installation of generating capacity in order to provide a market for the hydro power developed by the government plants that had come into the area over the last 25 years, are therefore faced with the necessity of installing their own generating equipment, not only to supply their increasing requirements, but also eventually to handle their present load in order that this power may be withdrawn and sold to the preference customers.

At a similar meeting on March 10, 1954, also held in Denver, representatives of the municipally owned utilities and the REAs operating in Colorado and Wyoming met with the same representatives of the Department of the Interior. In consonance with the announced policy that the Bureau of Reclamation was not assuming any responsibility for the area power supply, these preference customers were also told that they should look to other sources for their power supply when the power available from those federal projects now in operation and those that might be subsequently authorized and completed was fully utilized.

It has been stated that the new policy of the federal government not to assume utility responsibility for the power supply of an area will be very detrimental to the preference customers in the area. While it is only natural for anyone to resist increased costs of any commodity, the cost of electric service represents such a small part of the cost of living that it is of minor importance. If the power costs of the preference customers increase because they must obtain their future power requirements by the installation of their own generating equipment or by the purchase of power from an investor-owned supplier, there is certainly nothing that will prevent them from pursuing a vigorous load building program and making necessary adjustments in their rates just the same as an investor-owned company must do to maintain solvency. In fact, REA Administrator Ancher Nelsen, in a speech to the semiannual conference of the Colorado Association of REA Cooperatives, was credited with saying: "The one thing that will solve our problem is the sale of more electric power. Private utilities and REAs alike would rather sell more power than raise rates."

Rural electrification in Colorado, Wyoming and New Mexico has progressed steadily to the point where completion of the task in the near future can be visualized. This has been accomplished over a period of 18 years and the contribution of farmers and ranchers who have served as directors in the creation and management of the rural electric cooperatives has been an outstanding feature of this achievement. From the reports issued by the Rural Electrification Administration it appears that only a very few of the REAs in the nation are behind in their loan payments and a very large number have paid in advance of the due dates. The investor-owned utilities fully realize that the REAs have a definite place in the national economy and the REAs should also fully realize that the investor-owned utilities likewise have a definite place in the national economy. Each has its own field of activity which is quite well defined. It would appear that full cooperation between the REAs, the municipally owned utilities and the investor-owned utilities would do much to expedite the rural electrification program. It seems

"When the investor-owned utility purchases power from a federal project, any savings that may be realized . . . are passed on to its customers by means of rates approved by the appropriate regulatory authority . . ."

time that the obvious advantages of teamwork should be more generally applied to this segment of the electric industry throughout this area. This should mean joint discussions by those directly involved in planning and solving their mutual problems. It should mean coordinated load building programs that will provide the rural consumer with the knowledge of how to apply increasing amounts of electric power for his profit and better living.

In conclusion, the electric industry in the Rocky Mountain area can have no reason to be other than optimistic in its outlook not only for 1954 but also for the years to come. I am confident that our growth will continue at a very satisfactory rate and the problems attendant will be solved as in the past by the continued cooperation of all.

"It has become obvious that the logical, most economical way to expedite multipurpose development of the Northwest rivers is on a partnership basis."

A. W. Trimble, President
Northwest Electric Light & Power Assn.

For Efficient Northwest Power Development

BUILD A WORKING PARTNERSHIP

A. W. Trimble

GROWTH is still the watchword in the Pacific Northwest, and it most emphatically applies in the case of member companies of the Northwest Electric Light & Power Assn. throughout the areas they serve in the States of Oregon, Idaho, Washington, Montana and Utah and in the provinces of British Columbia in Canada.

In 1953 these companies expended approximately $107,000,000 for new plant facilities and have budgeted a like amount for expenditure in 1954. Since the end of World War II they have invested more than three-quarters of a billion dollars in their expansion program and have thereby more than doubled the value of utility plant facilities owned at the beginning of the postwar period.

Along with the plant expansion came increased business, of course, with total kilowatt-hour sales and average sales per customer reaching new all-time high in 1953. More than 17 billion kilowatt-hours were sold to something over a million and a half customers.

Electricity in these companies' service areas has been brought within the reach of almost everyone, whether he be in town or country. Very few who want electric service today are so located that it cannot be brought to their doorstep.

The electric future for the Northwest looks to be full of opportunity for this area has about 40% of the United States water power potential. The Columbia River and its tributaries can produce in excess of 30 million kilowatts of electric power capacity and, when plants now under construction are completed, only about 25% of this potential power capacity will have been developed.

There will still be an important job to do and the practical way of doing it is taking shape. It has become obvious to everyone who is willing to cast aside political philosophies and ambitions that the logical and most economical way to expedite the multipurpose development of the Northwest rivers is on a partnership basis, with local nonfederal agencies financing the power features in the great majority of cases and the federal government taking care of flood control, reclamation and other features of similar nature. The more nonfederal dollars that can be teamed up with funds that Uncle Sam may have available for river development purposes, the more development there will be obtained and the sooner the Northwest will reach its full potential.

To be sure, there is a vast storehouse of undeveloped resources in this great section of the North American continent, not the least of which is the hydroelectric power potential. Because of all these resources and the opportunities they offer to an alert, energetic population, future growth of the area is dead certain. A great many people are now earnestly working on the solution of the many complex problems involved and favorable results are being achieved despite obstacles being put in the path of progress by dyed-in-the-wool socialists, and certain professional politicians.

That the potential of this fabulous area will be converted into a reality in a sane and orderly fashion over a period of years as the needs of a rapidly expanding economy requires is the prediction from the Northwest.

"To me there is nothing necessarily tragic or alarming in a buyer's market . . . Selling and sales promotion are still American virtues."

J. H. Pengilly, President
Pacific Coast Electrical Assn.

With So Much to Offer Our Customers

LET'S START SELLING

J. H. Pengilly

IN reviewing the events of the past year, I suppose the one that has affected our industry the most has been the change from a seller's market to a buyer's market. This, of course, is not peculiar to the electrical industry because it has been widespread—numerous readjustments have resulted, including some increase in unemployment. There has been quite a tendency to develop political rather than economic explanations, with numerous wishful predictions of a recession or even a depression. It would appear from some of the press releases and speeches of new dealers and fair dealers that depressions are a built-in feature of a Republican administration.

At this point I should like to quote from an address given by a prominent electrical merchandiser. "Warehouses all over the country are bulging with refrigerators, electric ranges, washing machines. Electrical contractors are actually back in the business of bidding for jobs. It all adds up to the idea that our electrical industry must get back into the harness and must reinstitute and reestablish the type of cooperative merchandising activity which made the electrical industry progressive and successful when the balance of industry was suffering a depression." This statement was made five years ago by PCEA President M. G. Sues. I do not recall that anyone then disagreed with what "Pete" Sues had to say. The important point was that this condition existed when the "Fair Deal" was riding high. Business conditions did not receive the amount of political attention they are receiving today, perhaps because 1949 was not an election year. No remedial action was proposed by those who were in authority, other than opening the doors of the U. S. Treasury a little wider, if possible. Before the arrival of the next election, the famous police action commenced in Korea and the recession of 1949-1950 was ended at the cost of some 143,000 casualties in our armed forces.

It is agreed that today we have a buyer's market. The armistice in Korea hastened its arrival, and I think it will continue until we have another war, which I devoutly hope I may not live to see.

To me there is nothing necessarily alarming or tragic in a buyer's market. We live in a land of plenty. Scarcity and rationing and controls are not normal to our way of life. They are the result of war and they normally cease after a war ends and accumulated shortages have been filled. Selling and sales promotion are still good, solid American virtues.

We hear a great deal about unemployment which, incidentally, is not as great as it was in 1949. We hear less about employment, which is greater than in 1949. I would not speak lightly of unemployment. To the man out of a job, and in need of a job, unemployment is total and serious even if it is cushioned a little by unemployment insurance. To a business that is in difficulty, there is a depression. To most of us, fortunately, things are not bad. It is a relief not to be in frantic search for materials and personnel. When we want to buy something, it is pleasant to find products of good quality available and for sale by competent persons who appear to welcome us.

Facts and figures can be cited to show that the consumer dollar is there to be earned by those who seek it and who offer high quality goods and services at a fair price. The problem of our electric industry is to deserve and receive our fair share of the consumer dollar, so that the automobile industry and others, particularly the plumber, will be held to a reasonable share. I say the plumber in particular, as I think he has done a real job of promotion. Having a business based on sanitation and not inherently glamorous, he has sold many beautiful fully tiled bathrooms, often at the cost to the owner of an adequate electrical installation in the home.

"... The consumer dollar is there to be earned by those who seek it and offer high quality at a fair price."

As I look back over the years it seems to me that the romance of hydro generation, long-distance transmission and other wonders was so fascinating to us that we may sometimes have been tempted to talk about the marvels of the electrical age rather than to get down to the brass tacks of selling. High-voltage transmission and capacitors are interesting to us in the industry but they will not sell to the public.

Never before has our industry had so much to offer for the home. To mention a few, we have the beautiful modern kitchen with built-in features that save many steps—the home laundry where, at long last, we have followed the plumber's example and moved the clothesline indoors together with electric garbage disposal and incinerators. In addition to storage and preparation of food and disposal of waste, we now have air conditioning, light conditioning, heating of air and water, radio, television, "hi-fi" sound systems and so on.

And the key to the marketing of all of these wonderful things is adequate wiring, which is a natural for industry-wide cooperation that results in more business for all of the electrical industry.

Adequate wiring is not confined to the home, although perhaps that is where it is most often neglected. Adequate wiring of the factory, the store and the service establishment should receive and is receiving much attention by our business development section. Automation in the factory is arriving and will continue as wage rates go higher and result in greater consumer purchasing power.

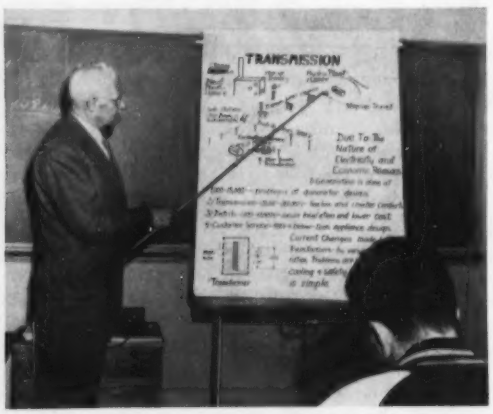
Promotion of coordinated effort of our electrical industry is the particular function of this association. As set forth in our Articles of Incorporation, one of our most important purposes is "to coordinate, promote and develop the electric industry *in all its phases* to the end that the best interests of the public and the industry may be served to the fullest possible extent."

When our present PCEA was incorporated in 1933 the founders planned it as a new and unique organization which was to be truly representative of the entire electrical industry. That was indeed a high purpose, very difficult to attain, and, while it has not yet been fully realized, substantial progress has been made. Our membership includes many member companies representative of all branches of our great industry.

Among some of the manufacturers, distributors, contractors and dealers, the interest and activity in our association is still not as great as we believe it should be in order to accomplish our mission. We should like to increase the activity of these important parts of the industry and are constantly seeking ways and means of so doing.

May those who have shown interest in our association by participating in its activities carry this message to others who are not members: "Whatsoever a man soweth, that shall he also reap."

In closing may I say that I see many indications that conditions are improving, not the least of which is the fact that we have a government that is not hostile to business and does not believe in taking over the electric power or any other industry.



Left: Team of experts—Walter Matson, WSC; Louis Price, Inland Empire REA; Carl VanHardenberg, WWP; David Hartzog, WSC; Vincent Slatt, Inland Empire REA; Rich Bakes, WWP. Right: Glen Cushing, Puget Sound Power & Light, an instructor

They Learned in Rural Clinics

More than 100 vocational agricultural instructors in the State of Washington received specialized training in a series of one-day rural electrification clinics sponsored by electric utilities, the State College of Washington and Washington Farm Electrification Committee.

Need for such a program was pointed up at a recent training conference, where vocational agriculture teachers asked for: (1) more complete background in fundamentals of power generation and distribution; (2) better understanding of electrical terms and their use as applied to farm electrical problems; (3) discussion of electric rates and their application for various types of rural service; (4) principles involved in adequate farm wiring.

The planning committee included two Vocational Ag teachers, three representatives of power suppliers and two members of the State College of Washington's Department of Agriculture Engineering. Reference materials were supplied by utilities and manufacturers. Illustrated lecture outlines and charts were provided by the WSC staff and electrical materials for teaching panels by Voc Ag teachers.

Utilities participating were Washington Water Power, Puget Sound Power & Light and Pacific Power & Light Companies; Inland Empire Rural Electrification Inc.; Snohomish, Lewis, Cowlitz and Chelan County PUDs; Big Bend, Columbia and Benton County REAs.

To get the greatest possible participation, seven clinics were held in areas requiring least travel.

"We have cause for concern over the number of USSR engineering graduates."

Morrough P. O'Brien, dean of the School of Engineering
University of California, Berkeley

In Our Military and Economic Conflicts

ENGINEERS PLAY A VITAL ROLE

Morrough P. O'Brien

THE place of engineers and engineering in our society and, particularly, the part which engineering plays in sustaining and enhancing our national productivity and standard of living is a subject which deserves especial attention during this period of international stress because there has occurred simultaneously a scarcity of engineering graduates. We are engaged in two conflicts—one military and the other economic—and engineers play a vital role both in supplying the materiel for our defense and in improving our economic status. We might win militarily but in doing so might destroy our economy; on the other hand, too great a concentration on normal affairs to the neglect of defense will leave us open to aggression. Skillful use of our resources in men, money and materials is required for ultimate success. We must somehow continue to provide an adequate supply of new graduates in engineering to carry on this work.

Some years ago the San Francisco *Chronicle* carried an editorial, apropos of a current news item which accused America of being unduly materialistic, which commented as follows: "Over the past three decades the United States has become increasingly the cultural and spiritual center of the Western world and that aspect of American life that prompts the charge of 'materialism'—the talent of the American people for the prodigious production of the implements of living—is what has made the preservation and the advancement of cultural and spiritual pursuits possible.

"We think—in spite of the ancient wheeze about poverty being the handmaiden of true art—that culture and material prosperity are mutually dependent and likely to appear in rather close ratio with one another. This is partly because freedom, itself, is hard to support without material prosperity, and without freedom so far as we know there can be no real cultural progress."

Examples of the effect of engineering activity on the public welfare are so numerous that it is difficult to choose among them. A good illustration is the cost of residential electricity which since 1932 has decreased on the average over the nation from 5.5 to 2.8c per kilowatt-hour while the cost of living increased from 58 to 110. The most interesting aspect of these figures is that generating capacity increased from 80 to 410 billion kilowatt-hours per year and the *Engineering News-Record* Index of Construction Costs rose from 135 to 410 during the same period. The average citizen obtains essential electric service at a decreasing cost while the cost of facilities for generation and distribution increased. No one group can be regarded as primarily responsible for this result but it can be said the operating companies and the manufacturers of equipment were strongly supported in their efforts to reduce costs by the work of engineering. Similar progress in cost reduction and improvement of quality is found in the aluminum, magnesium, plastics, aviation and other industries.

A good measure of the over-all effect of the development of machines and the use of power to aid men in their daily lives is provided by a study called the "Needs and Resources of America." It is a thorough analysis of the changes in productivity in the United States since 1850 in the amount a person earned per hour of effort and the parallel change in the use of the manpower, the animal power and machine power. Real income, averaged over the country and including all industrial workers, was 27c per hour in 1850 (in terms of 1940 dollars). In 1900 hourly income had gone up to 56c an hour and 1930, to 82c an hour. These figures are all in terms of the same 1940 dollars. The extrapolated figure for 1960—this study was made some years back—was $1.61, an increase by a factor of six times in the return per hour of effort since 1850. During the same period of 1850 to 1940 the average work week was reduced from 73 to 43 hours. Through the design of structures, circuits, machines and processes, engineers provide the means by which the productivity of labor is increased and the general standard of living raised.

Engineers should understand this function which they perform in society and should be aware of, and as a group

"Skillful use of our resources in men, money and materials is required for ultimate success."

work to influence, the policies and laws which tend to expand or circumscribe their activities. Engineering works, and the beneficial effects which they produce, require capital expenditures and a steady flow of capital, public and private, is essential to continued engineering activity. Tax laws, depreciation policies, real wages, interest rates, and many other factors influence the availability of capital for these purposes.

Term "Engineer" Clarified

Clarification of what is meant by the term "engineer" is pertinent at this point. Many definitions have been written, and the writer has been guilty of more than one, but none that I have discovered describes the functions of an engineer so aptly as that of Sadi-Carnot who in 1832 concluded his classic treatise on the second law of thermodynamics with this paragraph:

"We should not expect ever to employ in practice all the motive power of the combustibles used. The efforts which one would make to attain this result would be even more harmful than useful if they led to the neglect of other important considerations. The economy of fuel is only one of the conditions which should be fulfilled by steam-engines; in many cases it is only a secondary consideration. It must often yield the precedence to safety, to the solidity and durability of the engine, to the space it must occupy, to the cost of its construction, etc. To be able to appreciate justly in each case the considerations of convenience and economy which present themselves, to be able to recognize the most important from those which are only subordinate, to adjust them all suitably, and finally to reach the best result by the easiest method —such should be the power of the man who is called on to direct and coordinate the labors of his fellowmen, and to make them concur in attaining a useful purpose."

Are there many graduates of engineering colleges who practice engineering in the strict sense of predicting performance and costs of machines, circuits, structures and processes? As I see it, only a few of our graduates really practice engineering throughout their lives. A larger percentage practice engineering as a minor part of their activities. A majority of the graduates of engineering colleges engage in occupations for which their technical education is valuable but not essential and use the technical background directly only to a very minor extent. This siuation is not wasteful, in fact, it's the key to the solution of the problem which Great Britain is worried about and which we have solved more or less by chance. There has been an ample supply, at least until recently, of engineering graduates, not only for the design and development work, but also for construction, manufacturing, technical sales, management and many other functions. A statement by M. J. Kelly of the Bell Telephone Laboratories regarding this matter is particularly interesting because his associations I think are mostly with research and development. He put the situation very well in the following quotation:

"Through the years there has been a continuous increase in the use of engineers in the activities of manufacturing, distribution and technical service—and the top levels of management of manufacture are largely filled by engineering graduates. The service industries in their management and technical operations are also manned increasingly by engineering graduates.

"This broad extension of the area of use of the engineer beyond the professional operations of development and design has been one of the most important elements in the rapid increase in our industrial power. I am confident that our technological progress would have been much slower and our country's industrial strength of a considerably lower order if our technical education system had not supplied the large volume of adequately trained engineers for use in the management and technical operations of an ever increasing area of our industrial society."

I have contrasted the strictly engineering work of design and development with the many other functions performed by engineering graduates because it is important to remember that the engineering colleges of this country have always carried the burden of preparing man for these other functions as well as for engineering. A survey of the need for engineers which does not include these functions will be misleading because a large percentage of the graduates have ultimately found semitechnical or nontechnical positions.

The current shortage of engineering graduates results primarily from the low birth rate of the depression years and does not in any sense reflect an inadequacy in educational facilities and apparently does not indicate a change in the relative interest of students in engineering and the other professions. The number of graduates in engineering last year was 24,000, about half of the previous maximum. Forecasts of the number of high school graduates predict that the number will rise from 80,000 in 1952 to 160,000 in 1962. A surge of students is passing through the lower schools and it will reach the colleges in a few years. There is reason to expect that time will cure the deficiency in engineering personnel but presently a substantial shortage exists and it will continue for a few years.

Productivity Study

A recent study of productivity indicated that the difference between Great Britain and the United States in this respect was probably due to the relative supply of technical personnel in the two countries. If this conclusion is valid, and the evidence behind it is substantial, there is cause for considerable concern over the relative position of the United States and the USSR in the annual number of engineering graduates. A recent statement from the Engineering and Scientific Manpower Commission of the Engineers' Joint Council states the situation as follows:

"Any one who is inclined to discount the effort that the USSR is making to train and to utilize specialized personnel should be brought up short by the facts and figures assembled by Dr. Trytten. Comparisons with the U. S. are given in the following table, which employs 1951 statistics as a base:

	USSR	U.S.
Secondary school enrollment	37,000,000	30,470,000
College enrollment	916,000	2,116,000
Ph.D. or equivalent degrees conferred	5,500	7,700
Engineers graduated (1953)	43,000	24,000
Engineers in the labor force	400,000	500,000
Scientists in the labor force	150,000	243,000

"There is no element in this comparison from which Americans can draw satisfaction or take comfort. Following seven years of elementary training, students are directed into schools that correspond to our high schools, into 'technicums' (or subprofessional training schools), or into trade schools. With respect to college and university training, Dr. Trytten says:

" '. . . . the Russian higher educational establishments cover a five-year period. It must be borne in mind that American institutions of higher education generally include in their enrollment large numbers of people who have no stated professional goals during the course of their training. Consequently, the enrollments in American education must be discounted to allow for the large numbers of people who go to college merely to enrich their personal educational backgrounds without expecting to use their training specifically to achieve a vocational objective. . . . Enrollments in Russian institutions, on the other hand, are more closely related to the needs of the Russian State for trained personnel for its activities.

" 'Considering the training of specialists, therefore. . . . the yield in trained professional personnel of the Russian system is greater in numbers than is our own for the same number of students enrolled. It should also be noted that the American educational statistics do not differentiate with respect to the undergraduate and graduate students, whereas the enrollments given above for Russian educational institutions do not include those who are in the graduate school and are being trained beyond the university level. . . .

" 'One feature of the Russian educational system which needs additional emphasis is the technical institute or technicum training which was referred to earlier. These institutes are an extremely significant part of the training effort in the USSR. There is no counterpart to them in the United States, excepting for a small number of technical institutes, some independent and some set up by large industrial establishments, and the junior colleges of the United States which emphasize technical training. There were in the USSR 3,500 of these institutes with an enrollment of 1,200,000 students in 1952, with about 350,000 graduates per year. These schools have three-or-four-year courses. About fifty thousand of these graduates seem to be in fields related to engineering. Because of this substantial training program, the number of technicians or semiprofessional engineers available to the Russian economy appears to be considerably larger than the number of professional engineers in the ratio of approximately two to one.'

"Even in the schools that closely approximate our secondary schools, about 25% of the curriculum is devoted to mathematics, physics, and chemistry. Thus science and technology occupy a prominent place throughout the educational system. Although we have no desire to regiment education at any level, one must wonder whether we are not entirely too casual in our emphasis upon the science and technology on which our security and economy depend."

This statement has been quoted at length because it contradicts a widely held impression that the Soviet system is not likely to achieve technical success comparable with that of this country. As in all engineering work, the final test of the effectiveness of their educational effort lies in "hardware" produced. Recent reports of atomic, aeronautical and ordnance developments in the USSR indicate that their hardware is fully competitive and that we have no reason for complacency over our scientific and technical position.

BECAUSE PROBLEMS are best solved by discussion, Arizona Public Service Co. says...

"Let's Talk It Over!"

At Arizona Public Service Co., line foremen, production supervisors, office personnel are sitting down in small, informal groups for real old-fashioned cracker-barrel sessions. This is the result of the utility's "Let's Talk It Over" program, designed to give a better understanding of America's democratic system of government.

They are talking about the differences between socialism, communism and democracy. They are discussing advantages and disadvantages of these forms of government. They are discussing the threat that communism poses to the world — the effects that communism and socialism have had on our American way of life — and what the American people can do to combat these forces of evil.

Public Service supervisors say they don't feel that they are solving world problems in this manner but are confident that they are awakening themselves to the meanings and dangers of communism and the ever-present threat of socialism.

Following the pattern of programs originated by the Stanolind Oil & Gas Co. of Tulsa, Okla., Arizona Public Service has found that its program has aroused interest of banks, schools, clubs and military groups, which have asked the company to conduct a similar program for them or to send information, according to William Ismay, personnel manager.

The program is given in four two-hour sessions to groups of 15. Each group has a discussion leader, who is trained in advance by the company's personnel department. More than 500 Arizona Public Service employees will have participated before the program is completed.

"I warn you that you must continue to expand to meet the needs of a growing, prospering nation."

Ralph A. Tudor, Under Secretary
Department of the Interior

Power Development by

INDUSTRY AND GOVERNMENT

Ralph A. Tudor *

Under Secretary Ralph Tudor's Definition of Partnership —

First, the federal government will continue to build those projects that local interests cannot be expected to undertake. Take, for example, the multi-purpose Libby Dam on the Kootenai River in Montana. This dam is astride the international boundary. Furthermore, it creates substantial benefits downstream in three states as well as in Canada. These benefits are flood control, navigation and power development. The very complication of this project is such that there is small chance that any local public or private organization could build it. Therefore, we have recommended that it be a federal project.

Second, we will encourage and join with local public and private bodies wherever there is a project that lends itself to cooperative effort. I refer to those large multiple-purpose projects which include specific federal interests such as flood control, navigation, fish and wildlife, recreation and reclamation development for which the federal government can properly provide the funds and local interests can undertake to finance the reimbursable items such as power. The Tri-Dam project in the San Joaquin Valley is an excellent example of this joint participation. Here it is proposed that the federal government provide the funds for reclamation and flood control costs estimated at approximately $11,000,000, while local interests provide the money for power generation estimated at approximately $44,000,000.

Third, we will not interfere or oppose legitimate developments by public and private bodies in any region so long as these developments fit with a sound plan for the development of the resources of the region.

THE Department of the Interior has played its part in working up policies for this administration. We have 11 bureaus and several other separate entities within the department and one way or another have an interest and some responsibility in most domestic and many foreign issues. In some cases, we have been primarily responsible for carrying the ball and in this group has been the matter of federal power.

This is a subject in which, I am quite aware, you are vitally interested and so are we.

The Department of the Interior builds and operates a number of small and large hydroelectric generating plants in the western United States and Alaska. In addition, it is the marketing agent for all of the power generated at Army Engineers flood control and navigation dams throughout the United States. The only federal power which the Department of the Interior does not market is that generated by the Tennessee Valley Authority and, since that authority is not a part of the Department of the Interior, my remarks do not apply to it.

Last year our plants and those of the Army Engineers generated some 30½ billion kwh of energy and we sold this for $80,594,617. That is a pretty good sized power business and it has been growing over the years. Fifteen years ago the federal government had an installed capacity throughout the country of only 1,156 mw or about 3.1% of the total installed capacity in the nation. On Nov. 1 of last year the federal ownership had increased to 11,000 mw or 12.4% of the total. Incidentally, this latter figure includes TVA. Compared with 11,000 mw of ownership, nonfederal public installation amounted to 8,785 mw or 9.9% and investor-owned electric utilities owned 68,832 mw or 77.7%.

In 15 years the federal ownership has increased from 1,156 mw or 3% of the total to 11,000 mw which is 12.4% of the total.

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* From a talk before the Pacific Coast Electrical Assn. in Coronado, May 21, 1954.

"The entire federal power policy was framed within the limits of laws that have been passed by Congress in years gone by."

The federal government, therefore, is a pretty good sized utility and is a very significant participant in this field in certain areas.

The federal government first came into the electric generating field by virtue of the Reclamation Act of 1906. At that time the department was authorized to generate and sell power as a by-product from reclamation projects. This basic concept has never been changed by law. The Army Engineers were similarly authorized to generate power as a by-product of their flood control and navigation projects. In only one or two exceptional cases have special laws been passed authorizing either of these departments to build single-purpose hydroelectric generating plants. Thus, it has been almost 50 years since the federal government was first authorized to generate power for sale and the basic law remains that this power in generation is a by-product of other more fundamental purposes.

Since the Department of the Interior is the marketing agent for all of this federal power except TVA and built and operates many of the plants, it was logical that Secretary McKay assume the responsibility for reviewing past policies and initiating revisions where the administration thought proper.

A study to this end was started by simply asking our attorneys what the existing laws provide concerning certain fundamental questions. These questions included: When shall the federal government build a generating plant? When shall the federal government build transmission lines? Who are preference customers and what preferred treatment should they receive? What price shall the federal government charge for the power it generates? and other such fundamental items.

The attorneys for the department were asked to review all of the applicable laws and determine without bias or favor just what Congress has said since the original act was passed in 1906. This was no small task in itself for many laws have been passed.

When these answers were at hand, the policy statement on the various questions was prepared. This first draft was then reviewed by the authorities in the Executive Branch of the government who had a proper interest in the matter. This included the Army Engineers and the Federal Power Commission in particular. It was also discussed with Congressional leaders and, finally, with the Cabinet and the President himself.

Thus was the administration's power policy statement of Aug. 18, 1953, brought into being.

This policy was simple and, I think, quite understandable. I believe it is important to note that wherever there was a law applicable to the item involved, this law was quoted and made part of the statement. The entire federal power policy was framed within the limits of these laws that have been passed by Congress in years gone by. No new legislation was necessary.

Probably the most important item in the policy is the statement that the power supply of an area is a local responsibility. Only with the possible exception of the Tennessee Valley Authority has the federal government assumed any responsibility for supplying the needs of a local area. In no law that has been passed having to do with irrigation, flood control or navigation and which has brought into being power generation as a supplement to these more basic purposes has the federal government presumed to be responsible for local development in this connection.

This local responsibility is wholly in keeping with federal laws and, furthermore, it is a very practical policy statement. With the national debt now bumping along just under $275 billion, there is little to justify the assumption on the part of the federal government for undertaking to build all necessary additional generating plants throughout the country. This is particularly true since others are ready and able to carry most of the load. With the continued increased needs for power throughout the country, it will require the resources of all parties. By that I mean federal, local public and private enterprise.

You in southern California have, I believe, done reasonably well in meeting the power needs of your area. At times there have been shortages, but I am not aware of your having called upon the federal government to make up the deficiency as a matter of responsibility. In fact, I do not know of any area, again excepting the Tennessee Valley area, where the local people and local interests as a whole have looked to the federal government to meet their power needs. Rather, I think, the federal government has all too often in the past asserted of its own volition that this was a federal responsibility and requested appropriations and authorities to implement this thinking. We do not subscribe to such a philosophy.

If, as we believe, the local people are responsible for supplying their own power needs, the federal government cannot assume that it has the exclusive right or responsibility for the construction of any dams or for the generation, transmission, or sale of electric energy in any area, basin or region.

Could Not Agree with Pattern

In recent years the department has contested the right of others, both public and private, to develop certain hydroelectric resources. A pattern was being created and this was a pattern with which we could not agree.

This occurred in three specific instances, of which I presume most of you have heard. The one nearest home was on the Kings River in California. In addition, there was the Roanoke Rapids case in Virginia and, perhaps of greatest current fame, the Hells Canyon case on the Snake River between Oregon and Idaho. In each of these instances the department had contested the right of the Federal Power Commission to issue licenses to others.

We inherited all three of them. Very shortly after the

"The preference clause is the law of the land, and we propose to sell the federal power . . . in full compliance with its provisions."

new administration took office, the Supreme Court of the United States rendered its opinion in the Roanoke Rapids case. In this instance, the Federal Power Commission had granted a license to a private company to construct a hydroelectric plant on the Roanoke River over the objection of the Department of the Interior. In the opinion of the Supreme Court of the United States, Mr. Justice Frankfurter, after discussing the organization of the Federal Power Commission in 1930, when it was organized "as an expert body of five full-time commissioners," said:

"These enactments expressed general policy and granted broad administrative and investigative power making the commission the permanent, disinterested, expert agency of Congress to carry out these policies. . . . A principal responsibility of the commission has always been that of determining whether private construction is consistent with the public interest. . . . Particularly relevant in this regard is the estimate that public development at this site would not in the normal course be undertaken for many years. . . . Judgment upon these conflicting engineering and economic issues is precisely that which the commission exists to determine. . . ."

It must be apparent to anyone that in view of this interpretation of the federal law by the Supreme Court of the United States, the Federal Power Commission is vested with the full power, duty and responsibility of determining whether or not federal water power licenses should be granted and to whom they should be granted.

The Kings River case was at that time en route through the courts. The Hells Canyon case was still before the Federal Power Commission. In both of these, we were asserting that the Federal Power Commission had no right to issue a license to a private company and thus preparing to go to court.

Under these circumstances and in view of the Supreme Court decision in the Roanoke Rapids case, we simply withdrew from the court controversy in the Kings River case and revised our position before the Federal Power Commission in the Hells Canyon case. In the latter instance, we recognized that the Federal Power Commission has the right to issue a license to a private utility for developing this stretch of the river. We also recognize that it has the responsibility to deny such an application if the plan of the applicant wastes the resources.

We have supplied that commission with all of the plans, reports, studies and other material which the department possesses in support of the federal project to develop this site. We have made additional studies as requested by the commission. We have supplied every witness of the Interior Department which the commission has asked to call, and we have instructed those witnesses to fully and frankly state their views with reference to these matters. The Federal Power Commission, therefore, has and will have before it all of the information relating to this project that the Interior Department or its personnel has ever possessed, and this department has been complimented by the commission for the complete and frank disclosures that it has made of all of the evidence.

I have no idea what decision the Federal Power Commission may render in the case. Whatever it is we will abide by it. My only anxiety is that a prompt decision be forthcoming. The present prolonged arguments are in no way providing the thing that the Northwest so badly needs in this matter and that need is additional kilowatts. Legal arguments and long, drawn-out maneuverings are not the answer to this need for power.

It was not stated in our power policy but it is nonetheless true that we feel strongly that local enterprise should be encouraged and not impeded by us to solve its own problems. We will endeavor to create a healthy atmosphere to this end, and I think this is beginning to show results. Within the past year there have been a large number of applications for licenses to develop hydroelectric power by both public and private bodies, particularly here in the West. Some of these are not economically sound and will not be realized, at least in the immediate future, but most of them have real merit. So long as they do not deplete or waste a resource, we will certainly encourage them. In fact, we will heartily welcome local enterprise in development of power generation and transmission facilities.

Will Not Take Sides

Our power policy states, and we firmly believe, that if there is a choice to be made between public and private power, this should be determined locally and by the people who are to be served. We are not going to take sides as between public and private interests in any local area. If the local people want public power or if they prefer private power, that is for them to determine. In these local discussions and arguments, we shall wish both sides well and may the best man win.

There has been much ado about the preference clause in the various laws that have been passed by Congress and by the meaning of these clauses. The preference clause is the law of the land, and we propose to sell the federal power for which we are the marketing agency in full compliance with its provisions. It was first stated in the 1906 Reclamation Act and has been restated in virtually every reclamation act since that time and also in every navigation and flood control act that had to do with power generation. In keeping with the law, the department will operate its facilities for the benefit of the general public, particularly domestic and rural customers. It will give preference and priority to public bodies and cooperatives in disposing of electric energy generated at federal plants. Ordinarily, we will not undertake to dispose of power directly to consumers nor will we use or permit the use of the preference privilege as a means to provide power for large industrial consumers at the expense of domestic and rural customers.

The Department of the Interior has built and now operates some rather extensive transmission systems. Most of these are here in the West. We propose to recommend the construction of new transmission lines only to the extent necessary to provide economically feasible interconnections between federally owned generating plants so that these plants may be operated to the best advantage. We may also recommend the construction of transmission facilities to carry power to load centers within economic transmission distances unless others have or will provide these facilities upon reasonable terms. We do not believe that it is economically sound or justified

"If there is a choice to be made between public and private power, this should be determined locally and by the people who are to be served."

"There is no 'For Sale' sign on the big federal plants."

for the federal government to duplicate facilities unless the terms demanded for wheeling or other services are unreasonable. I do not anticipate that this will occur.

We have asserted that the department will plan and recommend the construction of generating facilities in multipurpose hydro projects when these are justified and feasible and when, because of their size or complexity, they are beyond the means of local public or private enterprise. In this respect, we propose to supplement rather than supplant local effort. I am quite sure that no local effort could have built Hoover Dam when it was undertaken, and there are a great many projects today where this is equally true. Where local effort cannot do these jobs, we will recommend entering the field.

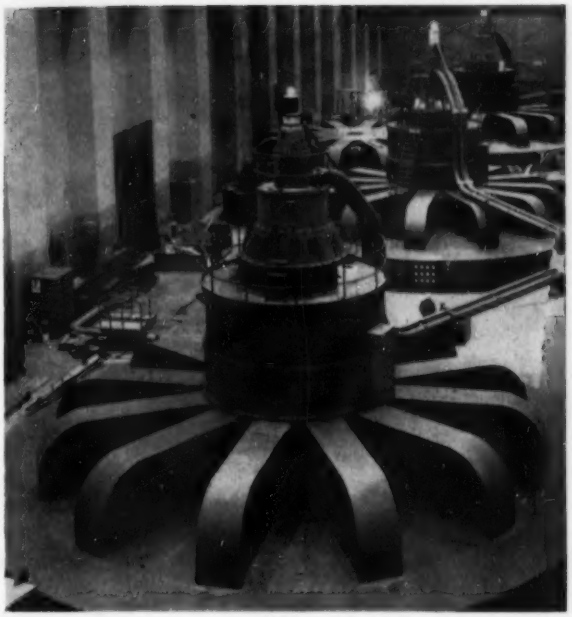
We believe that power should pay for itself and should not be a burden on the general taxpayer. We believe that all costs which are assigned to power facilities should be returned to the federal treasury together with interest within a period of not to exceed 50 years. I feel that in a few instances in the past, cost allocations to power generation have been made on some of the large multipurpose projects which were not realistic. We propose that hereafter these allocations will be kept within proper limits and the rates will be set to fairly recover the costs assigned. If this cannot be done, then the project is not justified and should not be authorized or built.

On a number of occasions, we have been asked if any of the existing federal generating plants are available for sale. We have responded in the negative. There is no "For Sale" sign on these big federal plants. We are not seeking an opportunity to dispose of any of them. We would much rather see available capital and credit go into new plants throughout the country. We believe it would be much more constructive and practical for you and others to use your funds and your abilities to meet the ever increasing demand for more kilowatts. If you do not do this, I am afraid that there might be some substance to the claim that the federal government will have to undertake the job. I am sure this is not necessary, but I simply want to emphasize that it is far more important that available capital be put into new plants rather than anticipating purchase of existing plants.

So that you may not be confused, I want you to understand that our present discussions with this state regarding the multipurpose and multiunit Central Valley Project and with the state of Arizona concerning the possible purchase of the transmission system, each wholly within these two states, are exceptions. In these instances, the states concerned have come to us with a proposal and in both instances these proposals are receiving our sympathetic consideration. It is possible that something may be worked out but, if so, it will be an exception to our general rule. We are not initiating an effort to dispose of the Central Valley Project or the transmission system in Arizona.

May I discuss for a moment the matter of the partnership principle. This is a broad term and fundamentally means simply that the federal government will work with the local interests in the matter of generating, transmitting and selling electric power. We will not try to dictate to you or usurp your responsibilities and rights.

The production, transmission and distribution of electric energy have become one of the most vital and necessary industries in the nation today. In the last 15 years the total generating capacity has more than doubled. Electricity is being used for more things and more of it is being used for each of these things than ever before. I have often wondered what would happen if suddenly we were denied electricity. Our communications would fail, our system of food storage and preservation would be lost, virtually every factory and manufacturing facility in this country would be stopped. Worse than that, all of our modern homes would be untenable. I do not mean we would simply lose the cook stove and the lighting, but the water supply and the disposal of sewage would be lost. We would be quickly reduced to very primitive living and it would be disastrous.



POWER from McNary Dam, an Army Engineers' project, will be marketed by Interior. Third 70,000-kw unit was installed in the power house last April. Ultimate plant capacity will be 980,000 kw

But, thanks to a well-integrated industry, and through interconnections, close controls, automatic equipment, etc., such a disaster is remote indeed. Your industry has met a growing challenge in an admirable way and I know of no reason to be generally critical. On the contrary, I think you have done much to increase the economic well-being of this nation, and I am sure that much of what you have done can be credited to the successful operation of the free enterprise system of this country. We believe in this system and, even though it perhaps has some faults, I know of no system that even approaches it in advantages.

It is necessary to the prosperity of the country that you continue to expand. You must provide adequate and reliable service to all responsible customers in your respective service areas. The industry, by the very nature of its operations, should and must be adequately regulated and I think that, with few exceptions, this is fairly accomplished throughout the country today.

I commend you for the admirable record which your industry has made. I warn you that you must continue to expand to meet the needs of a growing and prospering nation and this you must do in every particular. I am confident that your past record assures your future.

"When it is cold, all sorts of load increases in addition to electric heating affect curves."

Edwin Fleischmann, Consulting Engineer
San Francisco

How Outdoor Temperature Affects

ELECTRIC SYSTEM LOADS

Edwin Fleischmann

As electric space heating installations in homes and business places have become more popular, utilities throughout the country have manifested increasing concern about their impact on system loads. This is, however, only one phase of the problem and merely emphasizes the important role of temperature in utility planning and operation. When it is cold, most utilities are troubled not alone by the demand of the electrically heated buildings which have no other source of heat, but also by all sorts of other load increases, such as those resulting when customers turn on auxiliary heat in the form of small portable units or use their electric ranges for the purpose. It thus becomes evident that the over-all effect of temperature on system load, or on the demand created by large segments of residential and commercial load, is the fundamental question with which utilities are concerned.

To examine this problem, a comprehensive study has just been completed for a special committee composed of representatives of major electric utility companies in California under the chairmanship of O. R. Doerr, vice-president in charge of sales of Pacific Gas and Electric Co. The study approached the problem from four new angles:

1. Temperature-Affected Load—The literature in recent years has been replete with accounts of data taken during tests of individual homes or small groups of them heated electrically. Such data, while interesting, involve the problem of deciding upon what constitutes an average residence, the complications of determining diversities and the difficulties of apportioning costs on each segment of the complete system, when the actual cost of heating the individual home is only part of the story. If the loads of large areas, or even system retail totals, are used diversity is taken care of automatically and the effects of other electric loads dependent on temperature are likewise reflected. The technique that is here developed yields a measure of total temperature-affected load of the area or system.

2. A New Unit of Measurement—For many years the major United States Weather Bureau Stations have reported monthly degree-day statistics. A degree day, or more accurately one degree-day deficiency, is recorded on a day during which the average outdoor temperature is 64°, one degree below 65°. Because data were readily available, this unit has been taken over into the electric heating industry. It has, however, one major infirmity. In the gas and fuel oil business, and in the steam heating industry, the quantity of heat used per day is the unit, and the peak demand is the peak day demand. In the

What the Study Shows

The study definitely establishes that:

1. The proper measure of temperature effect to use in studies of electric space heating is the degree-hour rather than the degree-day.

2. The degree-hour deficiency below 70° when the outdoor temperature is 65° or less has proved to be a satisfactory unit for this purpose in the present study.

3. Good linear correlation exists between system load and degree-hour deficiency below 70° when the outdoor temperature is 65° or less.

4. Greatly improved correlation results if the data are divided into two groups: (a) weekdays, and (b) Saturdays, Sundays and holidays.

5. While the computations of the hourly slopes and correlations are laborious, they can be greatly simplified by punch card operation, and the results give interesting figures for operating purposes, as well as for rate design.

6. Hourly temperature-affected loads can be obtained for actual or normal years, and temperature-adjustment of revenues and expenses can be made with the figures obtained.

electric industry, the peak demand is an hourly or half-hourly one.

The proper unit for use in electric space heating calculations should therefore be the degree-hour deficiency rather than the degree-day. Furthermore, the 65° base appears somewhat low. Since heat is not generally turned on until the temperature drops below 65° and because there is usually an attempt to heat buildings to 70° thereafter, very close correlation of electric use and temperature should be obtained by utilizing the degree-hour deficiency below 70° when the otudoor temperature is 65° or less. The present study confirmed this fact.

3. The Varying Impact of Hourly Temperature on Hourly Load—Since customers' activities vary throughout the day, their needs for heat are different as well. Much less warmth is required indoors at 4 a.m. than would be needed at 5 p.m., even though the outdoor temperature at the two times is the same. The study disclosed that if hourly load at a given hour and the degree-hour-deficiency-figure, as defined above, at the same hour are plotted the points fall quite close to a straight line. It is thus necessary to plot a chart for each of the hours of the day, if a complete story is to be obtained.

4. Differences in Impact of Temperature-Affected Load on Weekends and Weekdays—The study showed that there were important differences between the impact of temperature-affected load on Saturdays, Sundays and holidays and the effect of such load on the system on weekdays. It is, therefore, important to make a separate set of charts for weekends and for weekdays, raising the number to 48 instead of 24.

In order that an adequate number of points could be plotted on the hourly charts so that the results would be reasonably representative, data on hourly loads and temperatures for at least 30 days were required for each set of charts. In response to a request from the committee chairman, 24 utilities throughout the country sent in records. (For various reasons, the usable data were confined to 19 utilities only.)

It would, of course, have been a very tedious task to plot charts for each hour for all these cases. The straight

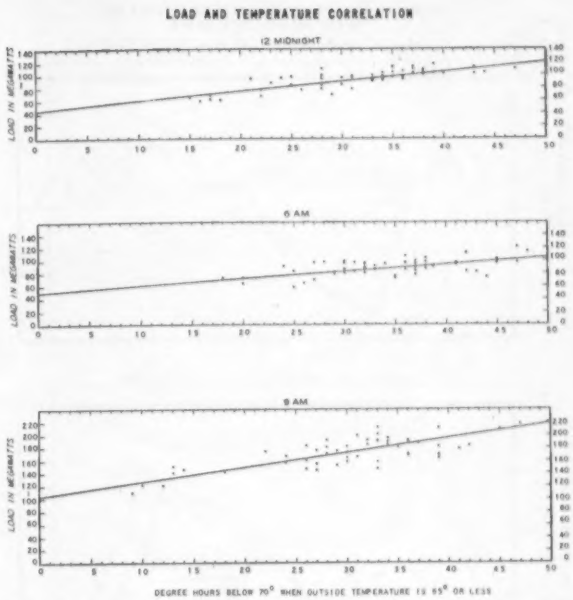

LOAD AND TEMPERATURE CORRELATION
12 MIDNIGHT
6 AM
9 AM
LOAD IN MEGAWATTS
DEGREE HOURS BELOW 70° WHEN OUTSIDE TEMPERATURE IS 65° OR LESS

Fig. 1

Table 1—Analysis of Coefficients of Correlation Computed from the Data

Case Number	Coefficient of Correlation Maximum	Minimum	Median	Average	Significant if Greater Than:	Number of Hours With Less Than Significant Percentage	Total Number of Observations	Time of Maximum Correlation
1	89.6%	45.2%	77.65%	72.47%	60%	6	14	2 a.m.
2	86.1	31.4	80.10	72.58	46	3	22	10 p.m.
3a	92.8	4.8	79.17	70.63	47	4	21	5 a.m.
7	61.9	7.2	43.80	39.26	27	6	57	6 p.m.
8	54.9	0.7	40.55	35.82	39	10	30	2 a.m.
9	44.0	8.2	30.80	29.60	38	20	31	4 a.m.
10	64.1	40.3	49.70	50.61	38	0	31	6 a.m.
10a	57.5	...	21.80	....	39	19	29	5 a.m.
10b	84.4	1.4	49.45	48.99	38	3	31	5 a.m.
10c	76.6	...	12.90	....	39	20	29	5 a.m.
10d	61.0	33.3	42.00	41.43	38	7	31	7 a.m.
10e	56.1	...	20.30	....	39	18	29	5 a.m.
11	77.9	8.9	30.15	38.10	38	13	31	2 a.m.
11a	71.0	...	15.00	....	45	20	23	12 m.n.
11b	62.3	...	....	....	39	21	31	7 a.m.
12	73.5	32.9	49.95	51.91	49	11	20	12 m.n.
13	22.8	...	7.35	....	38	24	31	2 a.m.
14	21.2	...	10.40	....	38	24	31	7 p.m.
14a	45.2	8.2	26.60	27.72	38	16	31	7 a.m.
16	64.1	8.3	32.35	34.95	38	15	31	8 p.m.
17	24.1	3.5	17.15	16.43	39	24	30	1 a.m.
18	43.5	12.5	19.15	20.27	38	23	31	7 a.m.
19	35.7	17.8	27.25	27.41	38	24	31	10 p.m.
19a	91.0	26.4	62.40	61.39	38	2	31	4 a.m.
19b	30.7	...	12.60	....	38	24	31	3 a.m.
19c	58.7	...	20.60	....	38	18	31	5 a.m.
20	41.7	...	20.50	....	39	23	29	7 p.m.
20a	78.1	...	31.10	....	39	15	29	1 p.m.
21	65.4	...	13.05	....	38	18	31	2 p.m.
21a	84.7	23.6	51.10	52.05	40	5	28	4 p.m.
22	54.8	...	33.25	....	41	18	27	9 p.m.
24	74.7	...	24.10	....	34	17	37	5 a.m.

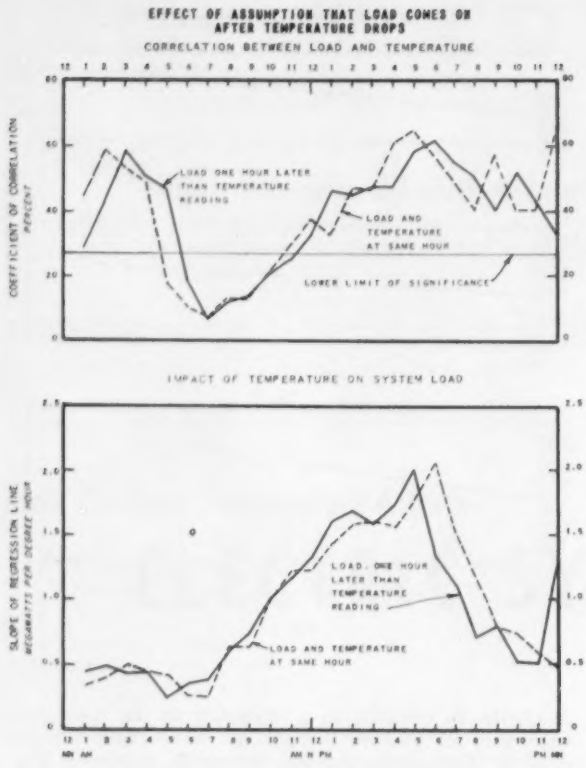

EFFECT OF ASSUMPTION THAT LOAD COMES ON AFTER TEMPERATURE DROPS
CORRELATION BETWEEN LOAD AND TEMPERATURE
COEFFICIENT OF CORRELATION PERCENT
LOAD ONE HOUR LATER THAN TEMPERATURE READING
LOAD AND TEMPERATURE AT SAME HOUR
LOWER LIMIT OF SIGNIFICANCE
IMPACT OF TEMPERATURE ON SYSTEM LOAD
SLOPE OF REGRESSION LINE MEGAWATTS PER DEGREE HOUR
LOAD ONE HOUR LATER THAN TEMPERATURE READING
LOAD AND TEMPERATURE AT SAME HOUR
MN AM
AM N PM
PM MN

Fig. 2

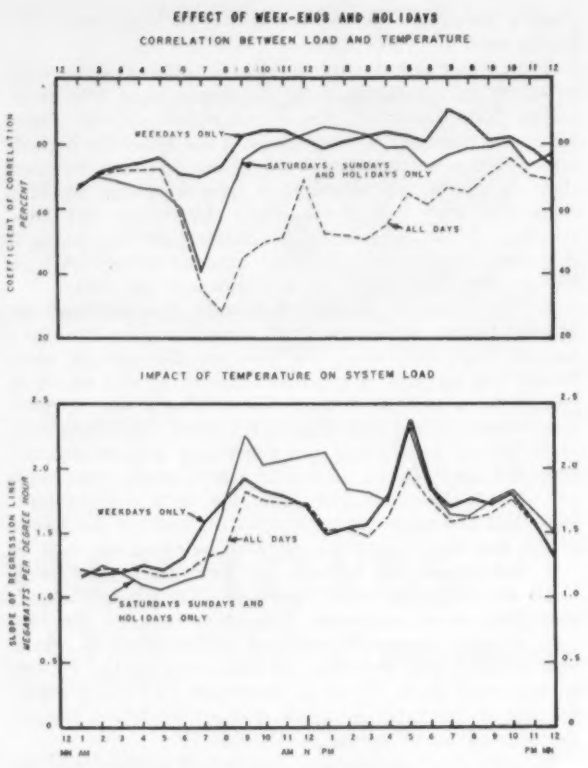


Fig. 3

lines were, therefore, computed by the method of least squares, using punched card methods. This greatly simplified the work. For each hour of the 24 there thus resulted a figure for the slope of the line, which measured the impact of the temperature-affected load on the system in kilowatts per degree-hour at that hour, the intercept of the line on the vertical axis, which gave an approximation of the nontemperature-affected load, and the coefficient of correlation which is an indication of the closeness of the points to the line.

Fig. 1 shows charts of three sample hours, on which are plotted a system retail load and the degree-hour deficiency at midnight, 6 a.m. and 9 a.m. on 55 different days. For each of the hours shown, the impact of temperature-affected load, the nontemperature-affected load and the coefficient of correlation are different.

	Midnight	6 a.m.	9 a.m.
Increase in demand due to 1° drop in temperature (slope)	1,516 kw	1,114 kw	2,254 kw
Nontemperature-affected load (intercept)	45,000 kw	51,000 kw	104,000 kw
Coefficient of correlation	77.28 %	61.32 %	75.71 %

In a study of this kind it was important to judge the validity of the results. Such a determination rests largely upon the coefficient of correlation. If these are poor, or below the statistical minimum, they are not significant and conclusions cannot properly be based on them. Table 1 summarizes the important figures in the 32 cases for which computations were completed.

The results of this mass calculation were generally encouraging. There were, however, certain variations in the correlation coefficients hour by hour which were difficult to account for.

Fortunately a quantity of data were available from one of the utilities (No. 7 in Table 1) which made it possible to isolate the reasons for some of the apparent inconclusiveness of the results.

In connection with the timing of the impact of temperature-affected load it was at first thought possible that the load came on somewhat after the temperature dropped. If this were true, the correlations between the degree-hour deficiency at a given hour and the load one hour later would be better than when the load and temperature are taken at the same time. In Fig. 2 the broken lines show the original data for Case No. 7. The solid line is based on the same data with the loads offset one hour. The coefficient of correlation is not improved as shown in the upper block of the chart, nor is there much change in the order of magnitude of the temperature-affected load hour by hour.

The effect of weekends, which have a somewhat different pattern in timing, was isolated in the case of Utility No. 7, with the results illustrated in Fig. 3. On the chart, the broken line shows the results of making the calculations for all days, while the heavy solid line is for weekdays only and the light solid line is for Saturdays and holidays.

It is very evident from the upper block of Fig. 3 that the comparatively poor correlation shown in many of the cases listed in Table 1 is due to the inclusion of data taken on both weekdays and weekends together. When Saturdays, Sundays and holidays are treated separately from the remaining days of the week, the correlation coefficients are much improved.

The temperature-affected load comes on more severely, but later on Saturdays, Sundays and holidays. The order of magnitude of the afternoon peak impact is, however,

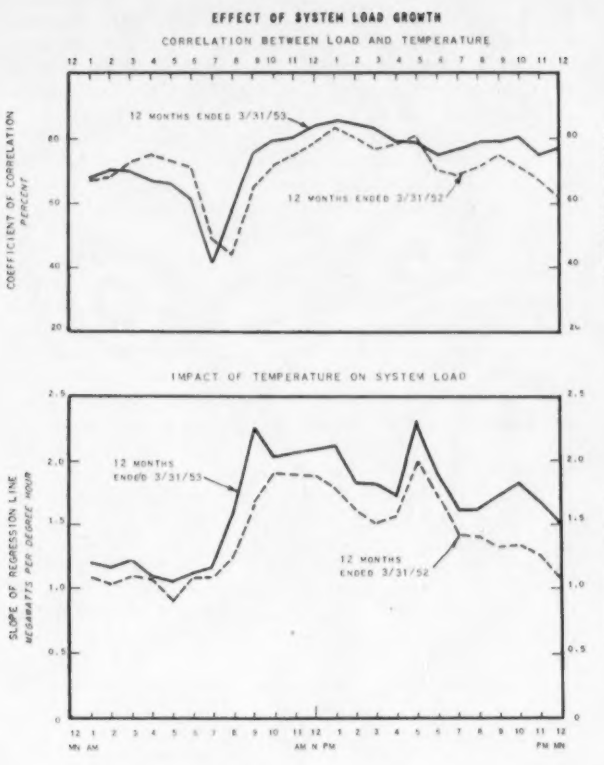

EFFECT OF SYSTEM LOAD GROWTH
CORRELATION BETWEEN LOAD AND TEMPERATURE
COEFFICIENT OF CORRELATION PERCENT
12 MONTHS ENDED 3/31/53
12 MONTHS ENDED 3/31/52
IMPACT OF TEMPERATURE ON SYSTEM LOAD
SLOPE OF REGRESSION LINE MEGAWATTS PER DEGREE HOUR
12 MONTHS ENDED 3/31/53
12 MONTHS ENDED 3/31/52
MN AM
AM N PM
PM MN

Fig. 4

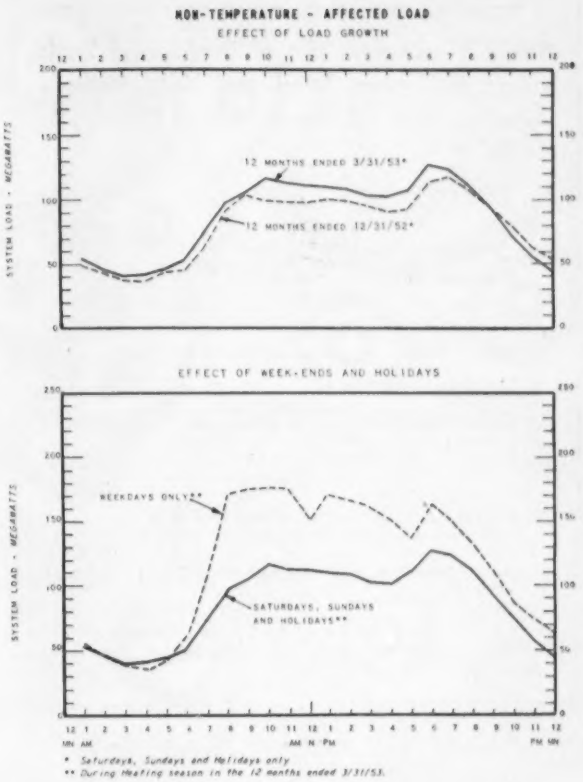

NON-TEMPERATURE - AFFECTED LOAD
EFFECT OF LOAD GROWTH
SYSTEM LOAD - MEGAWATTS
12 MONTHS ENDED 3/31/53*
12 MONTHS ENDED 12/31/52*
EFFECT OF WEEK-ENDS AND HOLIDAYS
WEEKDAYS ONLY*
SATURDAYS, SUNDAYS AND HOLIDAYS**
MN AM
AM N PM
PM MN
* Saturdays, Sundays and Holidays only
** During Heating season in the 12 months ended 3/31/53.

Fig. 5

the same on weekdays and weekends, as indicated in the lower portion of the chart.

Two sets of data one year apart were calculated, so that the growth of the temperature-affected load on the system could be illustrated. Fig. 4 shows the hourly impact of temperature on system load in these two periods. It will be observed that the coefficient of correlation is poor early in the morning, but in all cases it is well above the lower limit of significance (28%).

The data shown in Fig. 4 are for Saturdays, Sundays and holidays only in the two periods.

The point where each of the least squares lines intersects the vertical scale (Fig. 1, zero degree-hours) is a measure of the nontemperature-affected load at that hour during the period covered by the data. The upper block on Fig. 5 shows the growth of the nontemperature-affected load on weekends during two 12-month periods. The lower portion of the chart illustrates the difference in the nontemperature-affected load on weekends and weekdays.

It will be evident from the foregoing discussion that the correlation between hourly load and degree-hour deficiency, which has been used in this study, affords utilities a powerful tool, enabling them to estimate their temperature-affected load and, with the use of appropriate unit cost figures, to make suitable provision in their rates for serving it.

The method can also be used to estimate the temperature adjustment for normalizing revenues and expenses in rate proceedings. If the normal temperature is obtained by averaging the hourly temperatures, for example, over a 10-year period, the temperature-affected load may be computed by applying the slopes of each of the hourly lines to the resulting degree-hour deficiency at that hour.

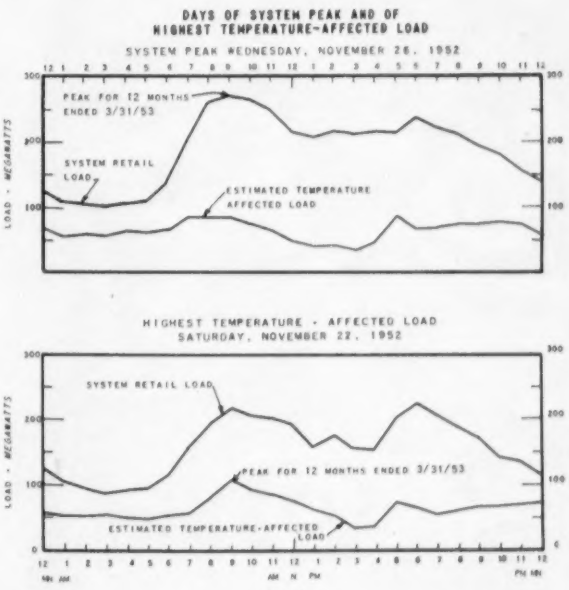

DAYS OF SYSTEM PEAK AND OF HIGHEST TEMPERATURE-AFFECTED LOAD
SYSTEM PEAK WEDNESDAY, NOVEMBER 26, 1952
LOAD - MEGAWATTS
PEAK FOR 12 MONTHS ENDED 3/31/53
SYSTEM RETAIL LOAD
ESTIMATED TEMPERATURE AFFECTED LOAD
HIGHEST TEMPERATURE - AFFECTED LOAD
SATURDAY, NOVEMBER 22, 1952
SYSTEM RETAIL LOAD
PEAK FOR 12 MONTHS ENDED 3/31/53
ESTIMATED TEMPERATURE-AFFECTED LOAD
MN AM
AM N PM
PM MN

Fig. 6

The same slopes can then be applied to the degree-hour deficiencies in the actual test year, and the difference in the kilowatt-hours thus obtained will constitute the temperature adjustment in kilowatt-hours.

In the process of obtaining the hourly temperature-affected loads, it is possible to plot that load each hour, if desired. Fig. 6 shows the system retail load of Utility

Table 2—Comparison of Peaks and Peak Hours of System Load and Temperature-Affected Load 12 Months Ended March 31, 1953.

1.	**System peak:** Date	11/26/52
2.	Time	9 a.m.
3.	Load	270,780 kw
4.	**Temperature-affected load on system peak:**	84,478 kw
	Maximum temperature-affected load:	
5.	Date	11/22/52
6.	Time	9 a.m.
7.	Load	105,938 kw
	Highest 6 p.m. temperature-affected load:	
8.	Date	11/27/52
9.	Load	74,334 kw
	Temperature-affected load on system peak as a percentage of:	
10.	System peak (4÷3)	31.20%
11.	Maximum temperature-affected load (4÷7)	79.74%
12.	**Highest 6 p.m. temperature-affected load as a percentage of maximum temperature-affected load (9÷7)**	70.17%
13.	**Annual load factor of temperature-affected load**	23.0%*

*Excluding temperature-affected load which the method applied to actual temperatures develops in certain night hours during June, July and August.

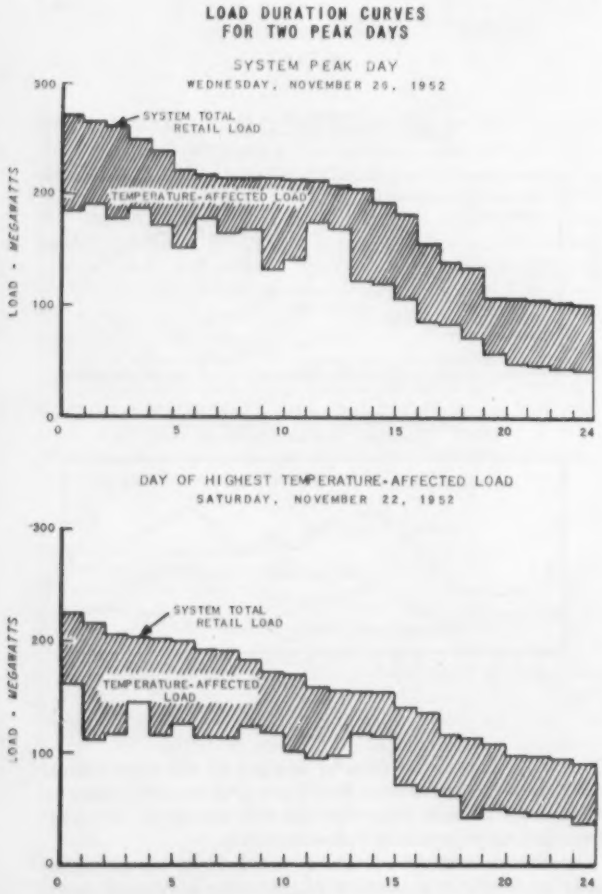


Fig. 7

No. 7 on the system peak day (Nov. 26, 1952), and the estimated temperature-affected load on the same day. Also shown are the system load and the estimated temperature-affected load on the day when the temperature-affected load was at a maximum (Nov. 22, 1952).

Table 2 summarizes some of the relationships, valuable in studying the cost of serving electric space heating, which may be obtained from such an analysis. During the year, the temperature-affected load contributed 31% of the load at system peak time, but less than 80% of the maximum temperature-affected load was on then.

If it be assumed that most of the temperature-affected load is residential and that the residential peak is at 6 p.m., the data show that the highest temperature-affected load at that hour was only 70% of the maximum system temperature-affected load for the year.

Shown at the bottom of the table is the computed annual load factor developed for the estimated temperature-affected load (23%). This is similar to those found throughout the literature on electric space heating.

Some idea of diversities between the peak of the temperature-affected load and that of the system may be gained from the percentages in Table 2. No data are available to determine how much of the heating load on this system is residential, although most of it is probably in homes. If this can be established, the intraclass diversity between heating and other residential uses can be approximated.

In addition to the load curves, such as those shown in Fig. 6, it is possible to construct load duration curves. When the calculation of the temperature-affected load is done on punch cards, the data for such curves are quite easily obtained. For example, Fig. 7 shows the system load duration curves on the two peak days used for Fig. 6, with the temperature-affected load indicated by the cross-hatched area at the top of the load. Fig. 8 is the load duration curve for temperature-affected load only during the month of November 1952. The highest temperature-affected load as well as the system peak during the year under study (12 months ending March 31, 1953) occurred in that month. It is interesting to note that the upper 10,000 kw of temperature-affected load is of very short duration indeed. Such information can be important and useful in the design and operation of the system.

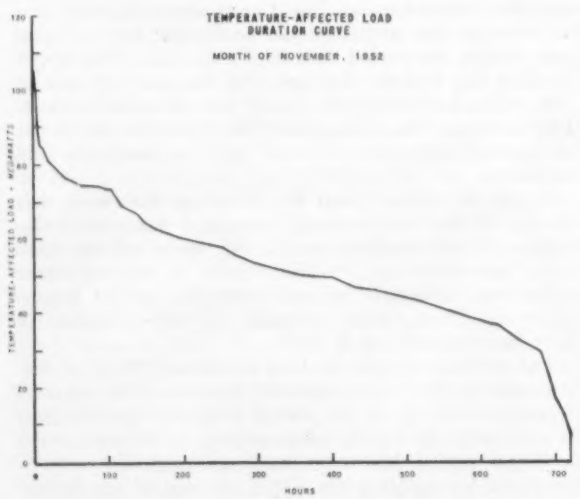


Fig. 8

"The best standard practice I know is to keep a new look on the standard practices themselves."

L. E. Karrer, Executive Vice-President
Puget Sound Power & Light Co.

To Keep Rates Low and Service Efficient

CONTROL THE LABOR FACTOR

L. E. Karrer*

ENGINEERS are technicians in a technical field. From the moment a kilowatt is born until its conversion into some other form of energy it is in an engineer's charge. How well it performs its task for humanity depends on his effort, his imagination, his willingness to adopt new methods and materials, to accept change as an asset instead of a liability.

Engineering is a great and honorable profession. It has within our lifetime made the chemist's test tube miracle a product found on every housewife's shelf or merchant's sales counter. It has made the physicist's laboratory experiment a TV set in your home. Yes, it has even played an important role in transforming a mathematical formula into a white mushroom cloud, the mist of which hangs as a pall over the world that is unable to discern whether it represents the dawn of a new era or the twilight of our existing civilization.

Against this magnificent backdrop of achievement, and as an engineer, I must confess at times I wonder if we are ever alert to the possibilities of our daily assignments. For instance, in the utility field much work has been done and a great deal more has been said concerning engineering standards of construction, maintenance and operation. Without doubt there is great merit in the proficiency and economy which standard practices can produce. There is no denying that truth. On the other hand, as an engineer, and irrespective of your present assignment, you should not for one moment be lulled into a state of mind which fancies that present practices and procedures necessarily represent the peak of perfection. The plain fact is that "Standards" do not imply that the practice itself is necessarily the best, but rather that it is the most acceptable under present circumstances.

Only too often the mere fact that a method or material appears on a printed form bearing many initials casts the subject in an aura of sanctity. The best standard practice that I know of is to keep a "new look" on the standard practices themselves. This is a challenge to the technician.

I have no doubt that you have sometimes wondered where your assignment fits into the over-all picture. Perhaps you have felt that your efforts were futile and your ideas were not given sufficient consideration. If you have had such feelings, let's place them all in the proper perspective. The utility business requires heavy capital investment in terms of customer requirements. On the average, an electric utility turns over its capital once in five years, whereas a commercial concern may turn over its capital several times a year. This particular characteristic of our business has far-reaching implications and it is to these points that I want to direct your attention and indicate how they affect you and your assignment.

This characteristic of our industry means that it does not have the opportunity of rebuilding its physical plant at frequent intervals. In fact, it would be my guess that most of the construction now under way on your respective properties will remain "as is" for its entire service life, barring, of course, acts of God.

Accordingly, great responsibility is placed upon the technical personnel to assure that plant improvements are made at minimum first cost consistent with the service requirements and the future operation and maintenance expenses. This responsibility is not always an easy one to resolve but it is yours as an engineer none the less.

Here is where your ingenuity, your imagination and application of new methods and materials can be utilized to great advantage. In this connection, may I suggest several illustrations. For instance, great care should be taken to critically analyze situations which have proved to be costly from an operating point of view. Likewise, the careful examination of equipment failures or service outages can open up a veritable "Pandora's Box" with respect to future construction practices. Data on the relationship of your job estimate to the final actual job cost can be most revealing and can point the way to the

* Based upon a talk before the Engineering & Operating Section, Northwest Electric Light & Power Assn., Seattle, April 16, 1954.

use of new methods, materials or ideas. As a matter of fact, changes brought about by other than technical advances can and will affect you in your daily work. For example, changes in the terms of a collective bargaining agreement can have a very important bearing on the future design, installation or operation of a given facility. There are endless illustrations, but I have picked only a few at random to show what the problem really is. It is of fundamental importance that the technical staff be continuously on the alert to recognize these developments and be ready, able and willing to change methods and procedures accordingly.

Is Aware of Responsibilities

The utility industry is acutely conscious of its responsibility to its customers to provide adequate service at the lowest possible rates. A good job has been done in that regard. However, the commodity which we sell—the kilowatt-hour—is in reality a pretty "tough cookie." There is not much that we can do to cut down the actual cost of producing the kilowatt-hour after the initial generating installation has been made because the fundamental characteristics of the plant are largely determined by the manufacturer's "know-how."

Admittedly there may be some improvements that the utility technician can effect after the initial installation has been made, such as the installation of newer type windings, better material for valves or turbine blades, more sensitive control equipment and a host of similar items, but the fundamental design of the unit remains the same and will, for all practical purposes, remain the same unit for its entire service life.

After "Reddy Kilowatt" leaves the generator bus the situation becomes somewhat different. The design, construction and operation of the transmission system allows much more flexibility to the utility engineer than does the turbine or the generator. This is fortunate, because it enables him to consider alternate possible routes, lengths of span, design and type of towers, size and nature of conductors, and similar items. These and other subjects provide opportunity for the use of new ideas that may not only save initial costs but future operating and maintenance expenses as well. There is still ample room in this area for improvement and for the exercise of your imagination and technical skills.

Next in line on Reddy's march to the customer is the utility's distribution system. Here we find many intriguing possibilities. First of all, it is in this phase of our business that we initially contact our individual customers. We are patronized for the service we offer and we are judged by the manner in which we carry out that responsibility. Second, the distribution system is a vital part of the operation because it represents a large part of the utility's investment and accounts for a sizable portion of its operating expenses. Third, since the distribution system is so closely allied with our individual customer's requirements, there is constant need for checking, studying and planning as to its adequacy.

Let us analyze further these concepts in the light of the technician's responsibility. Looking over the advertisements in trade journals, I get the impression that most every conceivable gadget for a distribution system

"What we want is maximum service with minimum costs and the distribution system plays a key role . . ."

is available. Each and every instrument, fixture or device is supposed to be "the last word" in distribution planning and design. Obviously, all of these gimmicks are not required or even necessary. There is no justification for every pole being a competitor of a Christmas tree. Simplicity is a virtue, and when it includes economies and reliability of service it becomes a necessity.

Basically, what we want to achieve is maximum service dependability with minimum costs, and the distribution system plays a key role in that objective. Dependable service does not mean two meters or two service drops for every customer. That would be labeled ridiculous even by an uninformed layman. Why is this? Not because two meters or two service drops are necessarily bad practice, illegal or out of order, but simply because through experience we have learned to use proper techniques so that the incidence of failures in these categories is so small as to be negligible. We have weighed costs against customers' convenience and determined a policy recognizing a proper balance. We have taken a calculated risk. The technician has been instrumental in that decision.

The foregoing illustration is homely and may seem to you rather naive, but I have chosen it purposely because it quickly and adequately illustrates the degree to which the technician's responsibility is wrapped up in the determination of basic policies. The hanging of a distribution transformer vs the extension of the secondary bus, the size and location of the substation vs land and line costs and load growth estimates, the number and size of distribution transformers vs wire distances and customer saturation, the economic evaluation of distribution losses and of better voltage regulation to the customer, to name only a few, encompass essentially the same problem—that is, first cost vs reliability of service and future operating expenses. The technicians must provide the basic answers to these questions.

Costs Can Get Out of Hand

Particularly is this the case as we experience load growth. Under such circumstances the technician is faced with a fluid situation and without proper precautions both first and future costs can get out of hand. There is little merit in constructing a permanent substation in an area that has not yet established its growth or use pattern. What difference does it make if the transformers are set on a temporary wooden foundation with a service life of at least five years when there is a good chance that within that time the substation will have to be moved, enlarged or otherwise altered to meet the customer requirements? On the other hand, a temporary structure, if not made permanent within a reasonable period of time, may cost a great deal in maintenance expense and

"There is not much we can do to cut down the actual cost of producing the kilowatt-hour after the initial generating installation has been made."

service outages. The technician's responsibility in this and similar instances requires study, application and resourcefulness.

As any operating man knows, the distribution system can be a glutton for man-hours and unless carefully watched can literally eat itself out of existence. In what manner does the technician get into this picture? First, of course, is the matter of service. Taking care of a customer's complaint or the restoration of a service outage represents the activities of a service man so far as the customer is concerned. It is important, then, that in planning the distribution system the technician repeatedly remind himself that the final product must lend itself to minimum service outages and ease of service restoration. This is such an elemental observation that it seems needless to repeat it here. Nevertheless, it is not only good business for the utility, but it just makes good sense to the customer.

Through all the foregoing illustrations runs a single thread which I believe should be isolated and more carefully examined. That thread is labor, or man-hours of work. In the utility business, where skilled workmen are required and wage rates are proportionately higher than in other industries, it is of primary importance that the labor factor be carefully and continuously watched. I cannot emphasize strongly enough the importance of this obligation on everyone connected with the utility business, irrespective of his or her assignment. A great many of our functions, whether they be in the operating, construction, accounting or sales department, can be simplified and you as technicians can be of great assistance to all of your fellow associates in bringing about the desired results. There are many functions that can be completely

"... it is of primary importance that the labor factor be watched."

mechanized. There are others that do not lend themselves to that particular method of treatment. But in every case we should be constantly on the alert to keep the man-hour component of our practices and procedures to a minimum and to mechanize wherever it is feasible.

I think I should make it clear that in suggesting close man-hour control, I am not necessarily suggesting pay roll curtailment as such. Rather, I am suggesting that ways and means be developed to accomplish more with the man-hours now available. This requires a study of methods and materials employed in a given operation, to determine if the same end result cannot be obtained with the expenditure of less human effort through the changing of materials used or methods employed or both. Such studies call for careful analysis if acceptable solutions are to be found. I have no doubt but that each of you has, at one time or another, engaged in the mental gymnastics required for the analysis of such a problem. I would also venture to guess that the solution you evolved surprised you with its simplicity.

These are some of my conceptions of trends in some of the internal problems of an electric utility and how they affect the technican. How you as individuals react to the challenges they present will insure progress or will portend a static business. But remember, "There is nothing so constant as change." It remains for you as technicians to show the way.

AT GROUP MEETINGS such as this, San Diego Gas & Electric learned how . . .

Employee Opinion Stacks Up

An important prerequisite to any employee opinion survey is that top management be prepared to do something about the answers it gets, in the opinion of M. E. Nelson, director of industrial relations for San Diego Gas & Electric Co., who conducted one recently for his organization. "If it isn't," he explained, "employee morale is worse off—if you publish the results of the survey, and you should."

A factor in the company's decision to go ahead with its survey was the success of others in the state. Coast Counties Gas & Electric conducted a survey in the San Francisco area in 1942; Southern California Edison ran surveys in the Los Angeles area in 1940 and 1952.

San Diego G&E had 8,419 entries in the comment column of its survey, conducted by California Institute of Technology, Pasadena. Of these, 3,749 were favorable; 3,380 unfavorable; 1,290 were suggestions. Of the 2,200 employees eligible, 99% responded.

A careful study of the comments and suggestions was made by the company's management council (which includes ten top officials) in a series of weekly meetings.

Nelson gives these rules for preparing a survey: (1) The questionnaire must avoid leading questions or questions on which, if you get unfavorable answers, you are not prepared to take action. (2) Don't expect impartial results before, during or immediately after wage negotiations; or before or after a strike; or right after having granted a fringe benefit. Try for a time of normalcy. (3) It is imperative that top management give full approval and support. Otherwise indicated corrections might not be accomplished and employee morale would not only fail to benefit but would decline. (4) There must be adequate assurance to the employee of anonymity.

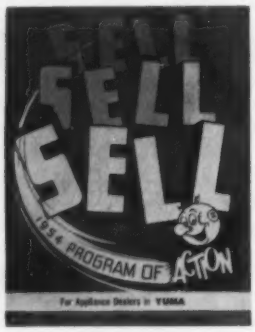
For a 3-D Sales Program, the prescription—

Rx . . . Sell, Sell, Sell . . . RAPP with WOMA

. . . The Missing Link to finance wiring . . .

Model Homes . . . Training . . . Commercial,

Industrial, Farm, Community Development



To Sell Again—

ARIZONA BLAZES THE TRAIL

NOT only the fastest growing state in 48, Arizona is also the sellingest. It is only natural that its major utility, Arizona Public Service Co., glow with some of the same enthusiasm, the same heat, as the sun that blesses it.

After an era of blight on the selling of electricity throughout the West there's inspiration to do things on a grand scale again by following Arizona's example. It is *the* complete sales program. Others have similar parts of a program but this one wraps up all the parts into a complete package which sings "Sell, Sell, Sell." What is more to the point, the sales records for the first half of the year prove that it *does* sell, sell and sell.

What it has that is new, in addition to those programs common to most utility systems, is its "RAPP with WOMA" and "The Missing Link." The first means "Reddy Appliance Purchase Plan" and it is joined in a way never before done with "Word Of Mouth Advertising." The Missing Link is also known as Reddy Hook-Up Plan, for it is a plan by which to offer convenient financing for installation, wiring, plumbing, new lighting fixtures or home modernization.

The unique thing about the employee purchase plan is that it channels through the dealer. Most company employees purchase plans are built around a wholesale operation in the company itself. That cuts out the dealer and also hurts the distributors whose lines are not carried.

But RAPP is a through-the-dealer plan and more than 400 dealers have signed up to participate in it. The other new feature is that it ties into it a prospect-getting obligation on the part of the purchasing employee. He is made responsible for demonstrating the appliance he has bought to neighbors and for turning in new prospects for further sales. And with this, he is given the necessary caution to sell its benefits based on the full retail price and to keep silent on the special discounts accorded him as an employee, both by the dealer and the company. The model home program also will have some new angles. And now as to the several parts of the program—

Sell, Sell, Sell

To the tune of "You, You, You" the complete sales program of the company was launched Feb. 11 by Don Willis, general sales manager, to 100 sales personnel from Phoenix and the four nearby districts. Then it was taken to the Prescott, Douglas and Yuma districts. Subsequently folders with full details of operation of the RAPP and WOMA, and Missing Link programs were prepared and special meetings held to launch them.

"Sell, Sell, Sell," is the title of the full 1954 sales program of action. Henry Sargent, president and general manager of the company and its top salesman, ignited it with his directive, "In 1954 every employee must sell, sell, sell, if we are to reach our goals. We must sell our company, sell our company's services, sell our American way of life. Let's put real depth into this 3-D program of action!"

The three aims of the program are: (1) Produce an additional $3,837,921 of estimated annual revenue during 1954. (2) Improve system load factory. (3) Produce the right types of load to bring maximum net profit for the sale of the company's services.

The over-all program of course embraces the usual residential, commercial and industrial, farm development, industrial and community development, sales promotion and advertising divisions. In addition are two not usually included—one on public information. That covers publicity, stockholder and employee relations. The other is on special services and includes sales training, special activities, summer programs, employee classes and economic education.

Using the panel technique each meeting of the sales

groups covered the company's program on adequate wiring; air conditioning; dealer-distributor-utility cooperation; duties and responsibilities of sales representatives; home service helps; working with engineers, architects, builders, contractors and equipment dealers; industrial potentialities of the region; commercial cooking and water heating, lighting for selling, production or recreation and the home.

For this first phase of the program Don Willis, L. H. Shaff, residential sales manager, A. R. Williamson, commercial and industrial sales manager, Les Waggoner, adequate wiring and air conditioning specialist, and Hal Boehm shared the leadership of the panel discussions. These were the briefing sessions before going into full action.

RAPP with WOMA

Before the Reddy Appliance Purchase Plan with its Word of Mouth Advertising follow-up could be launched both the dealers over the area served and the employees of the company had to be contacted. Here was a departure from customary methods. Here also was an extension of an already existing prospect getting system to link it with the employee purchase.

So two procedure folders were prepared, one for the dealers, the other for the employees. The latter was given to the supervisors who administer its use. The employees themselves were each given a brochure setting forth the opportunity to buy appliances, the way of it, and the "here's how to use your RAPP."

Employees were told, "You asked for it—here it is! . . . With RAPP you get savings up to 20% on household appliances through your WOMA credit. Authorized RAPP dealers offer you a 10% WOMA credit toward the purchase of appliances; Public Service will give you another 10% credit; and if you pay cash, you get an additional saving of 2%.

"With RAPP you buy your appliances directly from the authorized RAPP dealers in your area. (See your local Public Service sales representatives or local and district managers for listings of RAPP dealers.)

"With RAPP you get all the normal free services your dealers offer their regular customers—delivery, adjustments, installation.

"With RAPP you can purchase your appliances on easy payments through Public Service no-cost financing. There is no carrying charge or interest on the balance you owe after making the down payment on your purchase."

How WOMA, word-of-mouth advertising, works is next explained. It is emphasized that the WOMA credits must be earned by showing, demonstrating and selling the benefits of the appliance purchased to neighbors and friends. Five prospect cards are given with each purchase.

The steps are these: (1) Select the dealer and identify oneself to him as a Public Service employee by showing him the company identification card. (2) Select the appliance to be bought and have the dealer fill in a RAPP promotion offer form. (3) Take this to the supervisor, who gives a purchase request form to read, agree to and sign. This agreement contains a promise to buy only for one's own family use, to limit purchase to a five-year period, to refrain from discussing the special discount price, always quoting the full list price and finally not to resell the appliance within a five-year period. The employee's credit is then checked by the company. (4) A purchase order is made out to the dealer to deliver the appliance and bill the company. The employee gets a

The Missing Link

Reddy Hook-Up Plan of Financing

Because banks are seldom interested in small loans of less than $200, the Reddy Hook-Up financing plan is designed to save sales where the wiring and plumbing installation cost is an obstacle. It can be used to finance:

- Home wiring improvements.
- Wiring costs for an appliance that requires 220 v or a separate 110-v circuit.
- Wiring for modern home light conditioning.
- New wiring required for Adequate Wiring Certification.
- New light fixtures permanently installed.
- Plumbing required for water heater, automatic washer, dishwasher or disposal.
- Gas piping and vents for gas appliances.

Any residential home owner served by Arizona Public Service is eligible. In case of renters, the financing may be done with the owner. Cooperating dealers who need live demonstration equipment installed in their stores are also eligible.

Steps to take are simplified to these: (1) Customer selects the appliance or determines to have the work done; (2) Dealer or customer determines the cost from the contractor he wants to do the work; (3) A credit application form is filled out and checked by the company; (4) Upon credit approval, contract and note are filled and signed; (5) When the work is done, the contractor endorses the note and turns it over to the company with his invoice and inspectors' approval slips. After checking the inspection, the company pays the contractor in cash; (6) The customer is billed monthly on a regular bill, not with his electric bill. (This prevents forgetting the wiring and thinking the electric bill is too high.)

The limit of financing is $200. Above this the company feels the banks will welcome FHA title 1 loans and the company has no intention of competing with them. There is no down payment. Payments can be extended for six months for contracts from $10 to $50; 12 months for those up to $75; 18 months up to $125 and 24 months up to $200. The table schedule of monthly payments includes interest at 4%.

AN EMPLOYEE and his wife go to one of the dealers and decide, then—make out RAPP forms for the purchase and financing of it

sales order form on which the terms, special price and the retail quoting price are all given. Employees may buy for cash, on a 30-day charge or on an easy-pay plan for which a table is provided.

Final caution is given to "keep purchase details to yourself . . . and please, don't louse up the works . . . Respect the confidence Public Service and your authorized dealer have shown by making RAPP available to you."

What the Dealer Does

In a series of dealer meetings the RAPP with WOMA plan was explained to dealers and a procedure folder given each one. It was frankly stated a utility has three choices: (1) Either to engage in direct appliance merchandising to sell employees appliances so that they will have homes well equipped with modern appliances; or (2) arrange with distributors or factory representatives to make special savings available to employees; or (3) develop a plan to direct employee sales through retail appliance outlets so that dealers may realize a profit from such sales. Furthermore it can thus make a booster team of utility workers to promote appliances.

A test survey of dealers showed them enthusiastic for the idea. More than 400 signed the RAPP Dealer Authorization agreement and have been listed and referred to the employees. The lists also contain the makes of major appliances each dealer carries.

Worth of the word-of-mouth advertising is emphasized in the dealer procedure folder. In addition, being a cash sale for the dealer he can usually afford to give that 10% where so little selling cost is involved.

Dealers were told they would be paid in cash, they are not expected to accept trade-ins unless they wish to. Dealers deliver, install and service the appliances. Where extra installation cost is involved the employee may finance this separately with the company under its Missing Link plan and the dealer is relieved of that problem.

The forms to be used and how to bill the company, identify company employees, etc., are all illustrated in the folder the dealer received.

Costs and Results

Supervisors handling the employee purchase plan are also provided with a folder describing procedure and illustrating the steps to be taken and the forms filled. In checking the employee's credit, for example, the appliances purchased may not take more than 10% of his salary in total. Small appliances, power tools, movie projectors are not included in the plan. Temporary employees may not use the plan, only those in regular employment for more than six months.

The plan went into effect Sept. 1, 1953. In the first five months, to Feb. 15, employees had bought 552 major appliances to a total retail value of $144,000. This cost the company $13,000. In estimating what the total program will level off at, it was forecast that it would cost the company $20,000. After the initial surge of buying the run of purchases slows down as employees get their homes supplied. The purchases were heaviest from the Northern division and former Arizona Edison Co. territory because there had never been an employee purchase plan in effect in those.

There have been no complaints from dealers or distributors since the plan went into effect. Former plans, where purchases were made wholesale for employees, brought many gripes from the trade. Likewise the employees received no service. Dealers were not in the program at all. It was limited as to brands. The employee had to handle his own delivery, installation and service.

AMA and Dealer Program

In Phoenix and its immediate surroundings the Appliance Merchandisers Assn. is the selling force for the industry. Arizona Public Service gives it full support and

NEIGHBOR given demonstration to make her a WOMA prospect

aids it with many services. But it is the AMA that carries the ball. Public Service men are on the directorate and serve on committees, sometimes as co-chairmen. But officers and directors and special committee heads are dealers and distributors.

A full calendar of special promotional events was developed last year and announced to a big meeting in January by George Cornforth, AMA president, and William H. Johnson Jr., manager. Appliance ads of Public Service appear over the AMA signature in this area and everything is done to further an industry cooperation for the common goal—to sell, sell, sell.

In the Northern and the Yuma and Douglas divisions where a promotional league does not exist as yet, a coordinated program of advertising and dealer assistance, home service, appliance shows, etc., is carried on to give the same stimulus to sales by dealers in those areas.

The company does not merchandise. Only two campaigns a year vary from this policy and these are on lamp bulbs and on certified lamps, both of which receive so little selling by anybody else. For these campaigns prizes this year include a trip to Mexico City for the top salesman and his wife.

The company serves 125,000 customers and there are about 500 dealers in the whole area served.

Model Homes

Another new activity planned for this year will be the building of model electric and gas homes in Phoenix to be used as showrooms for the display and demonstration of appliances and light conditioning. These will be owned by the company and staffed by company personnel, then sold after a reasonable display period, probably three months.

Several builders who have been erecting good homes are eager to go into the program. The homes will be close in to be convenient but where traffic will not preclude parking. They will be in subdivisions where combined promotion of company and builder will be beneficial.

Each will have heat-pump air conditioning, built-in range, dryer, dishwasher and disposal, water heater and other appliances, be adequately wired and light conditioned. One wall will be removable to allow a display of the wiring behind it.

The company will buy each home on FHA as would an individual, with a regular down payment. Thus it can be resold as houses generally are. The homes will be in the $15,000 class, including air conditioning but the appliances will be sold separately. The built-in appliances, such as range, dishwasher and disposal and water heater, can be included in the loan however.

It is planned that clubs will be invited to hold meetings at the model homes—not only for women's groups but men's luncheon clubs like Kiwanis. With 10 residential salesmen and 8 home economists the homes will be staffed with people who can tell the electrical living story. The builder has also agreed that any extras put in will be priced so that they can be quoted to prospects for other houses in the tract who may want these in the homes they buy.

Special Services

As any dynamic selling program should, far more emphasis and importance is given to sales promotion and advertising, public information and to special services such as sales training, employee classes, economic education, stockholder and employee relations than in most other utilities. These are all part of the selling force. With a well-staffed public information department and a fine display and art department, the company supplies the advertising, promotion and display materials for every need. In fact it creates a variety of materials and illustrates them with snappy drawings in all company publications.

The sales promotion and advertising is headed by Jackson Hoagland with four supervisors of copy, promotion, special publications and advertising production under him. The public information staff is headed by A. F. Tudor, manager, who has five in his department for publicity and editing of *Spark & Flame,* the employee publication.

The display and art department staffed with clever cartoonists and poster men is an invaluable adjunct to such a publicity-minded selling program.

Under the title of special services manager Jack L. McDonald runs the training program. It includes public speaking and furnishing of speakers for meetings, sales training both for company sales staff and dealers, employee classes in speaking and for economic education. (See ELECTRICAL WEST, April 1953, p 87.) Special skits and summer programs with young people are also undertaken. The 4-H program and Reddy Adventure Club are under this department. For the second time this year a course on "Observation and directed practice in business" will be conducted for a group of teachers from Arizona State college. (Story later.)

In reviewing the entire program, some of it only briefly touched upon here because of similarities to other company sales programs, it would seem that if Arizona Public Service Co. has left anything out it hasn't been thought of as yet. If it is good and if it will sell it will be grasped and put to work too. The only thing lacking in this company is fear and pessimism. It is confidently building more steam generating capacity and it means to sell, sell, sell it.

Light's Diamond Jubilee was linked by reminiscing past presidents to the West's own electrical industry history in the opening skit

Teamwork Emphasized by PCEA Speakers

That yesterday's problems become today's challenges and tomorrow's opportunities in an industry in which all of its people work side by side for mutual progress and service was emphasized time and time again at the thirty-seventh annual meeting of the Pacific Coast Electrical Assn. Hotel del Coronado on San Diego Bay bulged at the seams from May 19 to May 21 as 870 electrical people gathered to celebrate Light's Diamond Jubilee—75 years of spectacular progress and development since Edison's invention of the incandescent lamp.

Significant facts brought home by a corps of outstanding speakers recruited by Program Chairman M. G. Sues included the following: (1) Atomic power is a resource that will become increasingly important 10 to 20 years hence; (2) Too much time is being spent speculating where our economy is and where it is going rather than working on the job; (3) The need for revitalized sales and merchandising efforts applies equally as well to the electrical business as it does to others.

Holding the convention at Coronado again emphasized the fact that a setting remote from a metropolitan center insures a self-contained, congenial and purposeful gathering. Convention attendance broke all previous records; interest in the sessions was high; entertainment was for all. Leon M. Guibara, U. S. Rubber Co., and his capable corps of committee chairmen and members were acclaimed for setting up the most successful meeting in PCEA history.

Here is a quick resume of the most significant statements of the many fine speakers. Their remarks are printed in detail on other pages of this issue.

PCEA President J. H. Pengilly: "Since the convention last year the Korean Armistice has been reached, followed by an uneasy peace, and the advent of a period of plentiful supply of goods and services. With the benefit of a good government that is not hostile to any segment of our electrical industry, we proceed with confidence to prove that our country and our industry can prosper without the stimulus of war."

Walter H. Sammis, president, Edison Electric Institute: "The problems of government in business and the preservation of our system of free enterprise must in the final analysis be adjudicated in the court of public opinion. The solution of the problem will be made easier and will come sooner when the public is fully advised of the problems and inequities that exist."

Charles P. Culbert, vice-president, Sues, Young & Brown Inc.: "Manufacturers and distributors must continue to institute aggressive merchandising programs for the independent neighborhood dealer because only by the power of positive thinking and positive action by all of us can the independent distributor and dealer continue to exist as vital factors in the distribution picture."

H. B. Walker, emeritus professor of agricultural engineering, University of California: "During the last half of this century I predict that electrical devices will come into the farmers' fields to control pests; to stimulate plant growth by providing light qualities of optimum value and duration; to feed the soil through the use of electronic controls for fertilization; to control atmospheric environment and to make field and farmstead operations more efficient, easier to perform and accomplished in more pleasant environments."

Herbert A. Leggett, vice-president, Valley National Bank: "Let's not kid ourselves. It's all right to believe in Santa Claus and in fairies and to wish and dream. But when we plan our business let us not confuse our dreams and hopes with cold realities."

C. C. Whelchel, chief of division of steam engineering, Pacific Gas and Electric Co.: "There is a certainty that in time most of the technical and nontechnical problems of atomic power generation will be solved. Then competitive atomic power, privately produced, will take its place with today's conventional power sources in providing for the future of America and the world."

J. M. Landis, vice-president, Bechtel Corp.: "The $64 question in atomic power is how soon will it be economically competitive with coal? An optimist will answer, 'in five years or so'; a pessimist, 'never.' I believe a more reasonable answer is in ten, fifteen, or certainly twenty years."

Ralph A. Tudor, Under Secretary, Department of Interior: "If, as we believe, the local people are responsible for supplying their own power needs, the federal government cannot assume that it has the exclusive right or responsibility for the construction of any dams or for the generation, transmission or sales of electric power in any area, basin or region. Our power policy states, and we firmly believe, that if there is a choice to be made between public and private power, this should be determined locally and by the people who are to be served."

Virgil M. Pinkley, editor and publisher, the *Mirror,* Los Angeles: "Let's all begin explaining what enlightened, progressive capitalism is and how it works, not only to the American public, but to the people of the world. And let us always be ready and willing to make any personal sacrifice to see that our way of life survives in a free world."

Kinsey M. Robinson, president, Washington Water Power Co.: "Public ownership sentiment has been on the decline in the Pacific Northwest for the past five years. Neither the officers of the companies nor the people interested in their securities have any great worries about further public power encroachment."

David L. Slipher, representing the National Assn. of Home Builders: "The electrical industry should now gird itself for action and follow through with a national program designed to sell builders and appraisers and, of course, the local FHA and VA offices on the voluntary standard which for the first time our association of home builders has established for wiring adequacy."

William C. Caples, vice-president, Inland Steel Co., Chicago: "We in management have spent a lot of money trying to bring people to a viewpoint, to create an attitude toward us. Our people are a lot of people—our workers and their families, our stockholders, the people in the communities where we live, our customers. Are we getting to them, convincing them?"

From Glorious Past to Promising Future

"Each of you face a future just as potent with opportunity, as brimming full of promise, as latent with achievement and triumphs."

Light's Diamond Jubilee was linked to the history of the electrical industry in the West for the dramatic opening of the convention. It was done in a very human and informal way by five well-known PCEA men, four of them past presidents of the association, who, sitting around a simulated campfire while fishing in the Sierra, recalled in conversation the historic beginnings of the industry in the West and who appreciated its present and looked with imagination toward a still promising future for the young men and women entering the business.

The five were H. H. Courtright, PG and E, Fresno; George C. Tenney, editor and publisher, ELECTRICAL WEST; R. G. Kenyon, Southern California Edison Co.; K. M. Ryals, former contractor, now manufacturers' representative; and I. W. Borda, the Okonite Co. The conversation was natural because each prepared his own script on assigned topics related to the history of the electrical industry in the West. The idea was suggested by Victor Hartley, PCEA managing director, and the presentation was directed by William A. Cyr, associate editor, ELECTRICAL WEST. Both in context and in presentation it was an embodiment of association teamwork.

With the musical overture and a prologue in which Light's Diamond Jubilee was linked with the history of the electrical industry in the West the curtains opened on a woodland scene. The fishermen came in, sat about the fire to warm up, fell to reminiscing and thus touched upon the past and future. In the "sky" back of them appeared slide pictures of historic installations or events to illustrate the memories they recalled.

The significance of Edison's first lamp was the beginning and it was linked with the formation of some of the West's very first electric plants and companies that since have become its major utilities. How the first high-voltage transmission was pioneered in the West and how the use of electricity went from street lighting from high towers to find its way into all kinds of uses was remembered with personal experiences. Contracting had begun with bell and annunciator installation and grown through the changeover period from d-c to a-c.

How the vision of A. G. Wishon turned the desert San Joaquin Valley green by selling farmers electric pumping and thus first gave the West the distinction of having the highest percentage of electrified farms was told. The long struggle against public power to keep the industry one of private enterprise was recounted as was the part Southern California Edison played in early surveys of the Colorado River and in dramatizing "white coal" from the Sierra. PG and E's development of hydro and subsequent balancing with steam, California Electric Power's long lines to bring electricity to the Imperial Valley were proudly remembered.

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Even atomic power was discussed and its future place in the supply of energy was touched upon. Through all, it was agreed, it was cooperation between all branches of the industry that had speeded progress and would continue to make the industry successful.

An inspiring note closed the playlet as Courtright recalled that the industry had provided each of them with opportunity and would offer the same kinds of opportunities for individual growth and achievement in so dynamic an industry to the young people coming into it now and the future.

The Electrical Industry Moves Forward

"We have no fear of government competition per se."

Walter H. Sammis
President, Edison Electric Institute

Ours is an industry that closely and profoundly affects the lives of practically all the people daily at their work and in their homes in a wide variety of tasks to be performed; one that is filled with problems, the solution of which can be accomplished in different ways and requires a high order of training, skill and judgment; one that not only requires dealing with materials and the powerful forces of nature, but requires wisdom and skill in the handling of relations with many people — employees, customers, officials of government, investors, and agencies in the world of finance; and one that continues to have vast uncharted boundaries. Surely, the electric industry, embodying all of these attributes, presents a continuing challenge to those of us who are employed in it, and also to any individual planning his life's vocation.

The true interest of the public must be the compass that at all times guides the course of management. The spirit of service—efficient, dependable service that is profitable to both customers and the companies—must dominate our thinking and actions.

Another primary responsibility of our job is to strive always to improve the efficiency of our operations and to hold down the price of electric service. Our industry has established a unique record during this era of inflation when the purchasing power of the dollar has dropped 50%, when construction costs, federal taxes, labor rates and the price of fuels have more than doubled. These economic changes have made rate increase a necessity, but through engineering achievements, improvements in operations and well-directed sales efforts, prices for electricity are lower today than they were before World War II. Where can one find another such example?

We have set standards of improvements that afford us no prospect of relaxation in the years to come in our efforts to serve capably. We must therefore look well ahead and scan all horizons to see how and where we can bring further benefits of low-price electric service to our customers. It is this consideration that justifies us in spending money on research and development, including research to discover how atomic power can be harnessed economically to supply electricity.

It is a well-accepted principle in the rendering of electric service that rates should be subject to regulation conforming with provisions fixed by state legislatures. With few exceptions the states have regulatory commissions. Under the regulation of these state commissions, the companies have been responsive to local needs and requirements of their customers.

By act of Congress there is a Federal Power Commission which also has certain regulatory powers and it has been well demonstrated that where there is overlapping regulatory jurisdiction, a federal agency, backed up by federal court decisions, often assumes the dominant role and the state regulatory body becomes secondary, if not subservient, in its position.

It should be accepted, as a basis of interrelations between the federal and state governments, that the regulation of electric light and power companies should be by the state, thus preserving states' rights, and that the regulation exerted by the federal government should be reduced to that minimum, which is fully justifiable in the interest of the customer, because either the state, or a compact of states, lacks jurisdiction over some part of the business. Were this broad principle adopted, there would be no justification in the case of licensing dams on navigable streams, or tributaries thereof, for the federal government to impose any conditions on such licensing relating directly or indirectly to rate regulation, but the conditions would relate solely to assuring a proper protection of the bona fide interest of navigation. Further, the term "navigation" should be redefined so as to exclude waters where navigation, in fact, is nonexistent, or is confined to a few pleasure craft, since in such latter situations there is no need for federal control. The entire matter would then be and would properly be the concern only of the states.

We would welcome steps by the federal government to reduce the burden of overlapping regulation by simplifying its requirements and by leaving more of the job of regulation exclusively with the state commissions. This overlapping regulation is costly to the companies and is reflected in their charges to their customers. Although some relief can undoubtedly be obtained by voluntary commission action under existing statutes, amendment of such laws is necessary for adequate relief in the public interest.

To sum it all up, we have no fear

Turnbull Pinkley

Tudor Kenyon

Whelchel Landis

of government competition per se. We do have deep fear of the destructive force of government taxation, combined with the continuing policy of Congress permitting government bureaus and agencies to compete unfairly in the power business. These problems of government in business and the preservation of our system of free enterprise must in the final analysis be adjudicated in the court of public opinion. The solution will be made easier and will come sooner when the public is fully advised of the problems and inequities that exist and how the public will be benefited by their fair and proper solution or elimination.

Merchandise — Or Drop Dead

"It behooves the manufacturer who prefers independent distributors to carry a greater share of the load or later pay more if forced to go it alone."

Charles P. Culbert
Vice-President, Sues, Young & Brown
Los Angeles

That the independent neighborhood dealer and the independent distributor can well become "the vanishing Americans," if some of the four basic problems afflicting them are not solved by the industry was the contention of Charles P. Culbert, vice-president, Sues, Young & Brown Inc. of Los Angeles. Then he illustrated how his own company was trying to meet this challenge with its strong program "Merchandise or Drop Dead."

1. First problem, not of the independent distributor's making, is made by the manufacturers who create unfair competition by direct sales to catalog houses, premium houses, house-to-house canvassers, tea and coffee companies, club plan operators, department stores, national chain stores and as contract manufacturers to other manufacturers. For, he said, it is a short step from there to direct sales to discount houses. None of the tremendous volume these do goes through distributors or dealers. These people buy below distributor cost on the pretext that it saves advertising, literature and displays.

"We don't believe such practices lend dignity to the brand name nor value to the franchise," Culbert said.

2. Factory branches he classed as the second problem after paying obituary tribute to Leo J. Meyberg Co., which closed its Los Angeles operation to be succeeded by a factory branch. In the Los Angeles market area he quoted figures that showed a decline of independent distributors from 10 top ones in 1950 to two in 1954. In 1950 independent distributor volume was 58%, factory branch 22.8% and chain and private brand 19.2% of the total. In 1954 it is running 16.7% for independents, 56.4% factory branch and 27.9% chains.

"Apparently many factory branches are born of necessity rather than desire," he said after showing that the independents must keep their overhead down to 10% to 12% while some factory branches run from 18% to as high as 25%.

3. National chain stores, he said, were another problem, for while accounting for a larger and larger share of the volume they buy none of their TV or white goods from any distributor. Sears, with its 23 stores in the Los Angeles market does 2 to 1 in TV sales as against 39 department store branches in the same area, 4 to 1 in refrigerator, 24 to 1 with automatic washers.

4. Newspaper advertising rate inequalities are a fourth problem for the independent distributor and dealer. Contract and earned rates are made available to national chain retail stores, buying groups and affiliated groups with multiple retail outlets, department stores with neighborhood branches. But independent distributors, acting as merchandising counselors for independent neighborhood dealers, in competition with such stores, must pay national rates for listing dealers. The difference for the Los Angeles *Times* Sunday is $21.14 per column inch at national rate, to as low as $8.78 for department stores. Yet other media — television, radio and billboards — give identical rates.

How his own company was trying to meet these problems by more aggressive merchandising programs and services at the dealer level to enable him to carry the ball was next described by Culbert. He outlined the "Merchandise or Drop Dead" program initiated early this year. He also said that the California personal property tax, due the first Monday in March, was detrimental to both business and the tax collectors since it gave an incentive to distributors and dealers to work from empty wagons. They make the first 10 weeks of the year low-volume periods. To combat this situation the program started in January to run through March and April and then to continue for the balance of the year.

The actual account of how this independent distributor attacked the problem was what he gave, he said, not merely a personal theory on how it should be done.

"Manufacturers and distributors must continue to institute aggressive merchandising program for the independent neighborhood dealers," he emphasized, "because only by the power of positive thinking and positive action by all of us can the independent distributors and independent neighborhood dealers continue to exist as vital factors in the distribution picture."

Electricity in Agriculture

"Any research that will help the farmer to produce more efficiently will benefit the industry."

Harry B. Walker
Emeritus Professor of Agricultural Engineering
University of California

The real farmer of today, when measured in terms of productive capacity, is a different farmer than his predecessor of fifty years ago. The modern farmer does not farm as a way of life, but as a producer of commodities to sell. Farming for mere subsistence is no longer of national importance, even though still rather widely practiced. Productive agriculture is carried out as an industrial operation, in which land, water, seeds, animals, fertilizers, insecticides, power and equipment become factors in management. Thus this evolutionary change has elevated an important segment of our farmers to a place of responsibility and prominence in our economic life. The many services that have been provided for him through related industries have made this possible, and at the same time these have provided for rural dwellers many conveniences, making possible attractive living environments.

From the production angle, agriculture as a raw product industry is distinctive. To produce more of higher quality from relatively fixed land areas is a challenge in which every form of resource or service must be evaluated. To know when, how and what to utilize cannot be mere guess work, nor can rule of thumb methods be followed. Answers must be found from more exact knowledge acquired through appropriate research, and subsequently modified for practice by experimental procedures. The future of our agriculture progress depends more and more upon research and experimentation.

Agriculture in the West, as in the nation as a whole, must be considered basically as a productive enterprise, subject to further development by industrial methods. This involves increased efficiency which calls constantly for a higher level of management. Such management must seek better methods to obtain higher yields, from the limited land and water available. Likewise, the farm products must be harvested and processed with less waste.

Already California's hay crop worth, in 1950, $125,000,000 is being improved in nutritive value by barn drying methods developed through agricultural electric research. It is not unlikely that electricity may come into eventual use in the control of one of our worst soil pests—the nematode. The use of electric pig brooders has been established, and now modern starter rations call for a synthetic sow to go along with this brooder, so that the mother hog may be made available more promptly to naturally generate a new litter. The use of elecronic devices to determine the size and color of citrus fruits has been developed through research and may soon appear as devices with judgment for packing house operations. The utilization of light, which has paid such big dividends in poultry production, is being extended to the field of floriculture to bring flowers into production at the optimum market opportunities.

More and more animals are being fed by automatic equipment now commonly referred to as "push-button" feeding. Everywhere on the farm if a special mechanical task is contemplated for such work as fruit washing, cutting, polishing, waxing, and the like, an electric motor has a potential job. As an electrical utility man recently expressed it, no longer is it essential to point our research toward direct applications of electricity on the farm. Any research that helps the farmer to produce more efficiently will benefit the utilities, for it has now been amply demonstrated that somewhere along the line, either on the farm or in the processing plant, more electricity will be needed.

The past half century has been one of outstanding achievement in the application of electricity to agriculture. It has grown from a small beginning, to universal acceptance; from extension of service to a few farms to more than eight out of every ten farms of the nation. It has brought hidden ground water to the surface for the irrigation of millions of acres of farm lands; it has added so much to the potential attractiveness of country living, that urban dwellers are seeking its advantages.

But we must not become complacent because of past achievements. Already electronic controls are appearing on farm field machines. With the development of atomic power, and its translation to electrical energy, we can look forward confidently to setting aside larger and larger blocks of electrical energy for farm productive and processing purposes.

During the last half of this century I predict electrical service lines will grid, much more closely than now, our fields to bring water to crops by sprinkling, or other methods of distribution. Electric devices will come to our fields to control pests; to extract, or fix, at higher values the nutritive, or other basic values, of farm crops; to stimulate plant growth by providing light qualities of optimum values and duration; to feed the soil through the use of electronic controls for fertilization by water distribution, or otherwise; to control atmospheric environments for optimum plant growth, or to prolong storages without loss of quality; to improve the appearance, flavor, and handling qualities of our fruits and vegetables, and to make field and farmstead operations more efficient, easier to perform, and accomplished in more pleasant environments.

Surely the electrical industry must plan to serve agriculture in a way that will make man the master of the land in order that its bounties may yield for every one an abundance of food and fiber. Greater and greater dependence must be placed in research.

Truly electricity in agriculture has become not only an essential service, but a service of great potentialities, and let us remember "He Who Serves Agriculture Serves All Mankind."

Let's Not Kid Ourselves

". . . when we plan our business let us not confuse our dreams and hopes with cold realities."

Herbert A. Leggett
Vice-President, Valley National Bank
Phoenix

"It may strike a sour note in this symphony of sweetness and light," said Herbert A. Leggett, vice-president, Valley National Bank, Phoenix, in debunking "The Economic Outlook" in a most cheerful and amusing way. "I am not going to give you the standard hogwash that is dished out at meetings of this type. All over the country you see grown men telling each other bedtime stories and you never like to wake people up when they are dreaming happy dreams.

"I don't think it will hurt us to ponder what is happening: Two million out of the nation's four million business concerns have never operated in a buyer's market. It may come as a shock to these that business doesn't consist of merely filling orders. When we have a depression it may be relatively prosperous as compared to that in the '30s, even as that one was nothing to what some in the '90s were.

Seven Deadly Delusions

1. That the federal government can prevent depressions.
2. That our economy is more stable than in the past.
3. That we have learned how to control the business cycle.
4. That military expenditures produce prosperity.
5. That a lot of babies insure continued prosperity.
6. That borrowed money represents income.
7. That things are different now than in the past, i.e., that we have repealed all of the established laws of economics, physics, nature and human nature.

When you go from an index of say 50 up to a boom of about 200, a drop back to 150 may seem like a bad depression.

"But even depressions are never everlasting. While we in these states of the West have enjoyed a population increase, 13 out of the 48 states have lost people since the census of 1950 and a dozen more have had no increase. That is, at least 25% of the country has not grown at all. Se we in the fabulous West sometimes overlook the fact that this type of growth is not normal.

"The sun does not set on the day when there is no economic forecast," he said, and then recited a group of recent quotations and ones made 25 years ago before the depression, adding, "The words are the same but the names of those making them are changed to confuse the ignorant. Our business prophets today are saying the same things they did 25 years ago. The lesson from this is that we should take a more objective and realistic view.

"My only advice about economic predictions, no matter who makes them, is don't waste time reading them. Each of us has to do his own observing. Each has to stand on his own feet and think his own thoughts."

With cheerful candor Leggett debunked the political promises and pump priming of both parties under the pressures of forthcoming elections. He kidded the futile tightening and loosening of money, stepped up and stepped down military expenditures, stockpiling and other manipulations that all resemble 1928 when another presidential election was brewing. "It may be history just repeating itself," he deducted. "In spite of lofty objectives and campaign promises, if one were to be critical of Washington, the administratiion is perpetrating all of the economic fallacies of the democrats and all of those the republicans had when last they were in office."

Two "myths" he particularly objected to: (1) That savings are rising. This he analyzed as transfer of money to savings accounts because of higher interest rates and to calling payments on mortgages and life insurance savings. Yet he said, for 12 consecutive years the country had been spending 110% of its annual income. "That's like perpetual motion," he quipped. Instead of savings it represents a mortgage debt increase of from 18 to 58 billions. (2) That inventory readjustment is over. The ratio of inventory to sales is at a new high, he declared. "Who is kidding who?"

Concluding he listed "seven deadly delusions" (see box) and, after briefly elaborating on why they are delusions, he ended with a plea:

"Let's not kid ourselves. It is all right to believe in Santa Claus and in fairies and to wish and dream. These help us live with some the harsher aspects of life, but let's recognize them as dreams and wishes. If we were to go around worrying we could give ourselves economic hyperchondria and end up stark staring mad. But when we plan our business let us not confuse our dreams and hopes with cold realities."

Today's Outlook for Atomic Power—A Symposium

"Such a potent source of energy certainly cannot be overlooked by the power industry."

J. N. Landis
Vice-President, Bechtel Corp.
San Francisco

There is, at the immediate present, no compelling reason to find an alternate source of fuel for our United States power industry. However, fuel is being used in large and ever-increasing amounts, and looking ahead a long time we can see impending shortages of coal, oil and gas.

The accompanying table reviews the world's energy reserve in coal, oil and gas and compares these to the energy reserves which will be added from uranium and thorium. At present the approximate annual world burn-up of energy is about 1/10 to 2/10 x 10^{18} Btu. In the next 50 years we shall use about 20 x 10^{18} and in the 100 years 2000 to 2100 A.D., about 100 x 10^{18}.

At first glance at the table, coal reserves look good: a hundred years' supply. The adequacy of the gross amount is misleading because of the large reserves of low grade coal in the Rocky Mountains. In the East there will be serious shortages of high grade coals within 50 years or less. These conditions will let energy from nuclear fuel sources compete with coal.

Oil reserves are holding up well, but the power companies are being forced to heavier oils at gradually increasing prices and find coal a better buy in the Midwest and along the east coast.

Gas, a very favorable fuel to use if the price is right, cannot be transported except by pipeline; hence, reserves in other continents are of no value to us. Looking at our own gas reserves, we see an estimated supply of many years at the present rate of use, but gas will be reserved more and more for domestic users and for chemical manufacturers. Before long, for power generation gas will increasingly be used only as an auxiliary fuel in most new plants.

By comparison, the energy available from economically recoverable uranium and thorium is over 20 times the energy available from coal, oil and gas. Such a potent source of energy can certainly not be overlooked by the power industry.

Those who are working in nuclear power field are currently faced with the problem of choosing the type or types of power reactors that offer the most promise. The accompanying illustration indicates the relative standing of the major contenders for immediate interest, as measured against different criteria.

Five principal types of reactors are listed. The numbers indicate the relative standing in order of preference. In all fairness, I should point out that these ratings are subjective and some one else might present them somewhat differently.

It is apparent, however, that no one type has a decided advantage over the others. The light water reactor, for instance, can be built most easily and most cheaply but is the poorest in efficient utilization of fuel and does not seem to show the economic promise of other types. The fast reactor looks good from the standpoint of revenue but requires the most development and will be expensive to construct.

Tracy Schmitz

Lasher Hicks

Caples Robinson

We are unable with what we know at present to evaluate the relative advantage and disadvantage of each type quantitatively to arrive at a best choice. The Atomic Energy Commission has therefore recently announced plans to develop five types of reactors with the intent of establishing one or more as a potential producer of economic power. The five are:

1. Pressurized water reactor
2. Boiling water reactor
3. Homogeneous reactor
4. Sodium graphite reactor
5. Fast breeder reactor

In addition the AEC will carry on a generalized program of power reactor development including plutonium fuel element fabrication techniques. At least two of the five announced reactor projects will involve participation from private industry, namely the Westinghouse - Duquesne pressurized water reactor and the North American Aviation Co. sodium graphite reactor. Other industrial study teams are trying to determine how best to enter the business, feeling that a private utility is greatly limited in its ability to invest risk capital in an unprofitable venture.

The $64 question in this business is, "How soon will nuclear power be economically competitive with coal?" An optimist will answer "In five years or so!" a pessimist, "Never!" I believe a more reasonable answer would be in ten, fifteen, or certainly twenty years.

Certainly no peacetime scientific development in the long history of mankind has ever had the expenditure of effort and the financial assistance which are now going into the development of nuclear power, not alone in this country but over the whole world.

"Until the Atomic Energy Act is amended, there will be no privately financed electric power."

C. C. Whelchel
Chief, Division of Steam Engineering
Pacific Gas and Electric Co.

Future applications of atomic energy and the speed with which they are made will depend on finding the answer to a number of complex technical problems and the elimination of a number of obstacles and limitations, nontechnical in nature. First, and most important to those studying the feasibility of industrial or private development of atomic power is its comparative cost with conventional power.

Establishing what nuclear power should cost in order to be competitive is not difficult. Predicting what it will cost and when it will be competitive is an indeterminate problem at the present time. It is possible, however, to analyze the gap between estimates for plants based on today's knowledge and the range of costs required for a competitive nuclear plant.

Today's estimates of capital costs for nuclear power plants vary greatly, but are in agreement to the extent that they are all high. They range from $350 to $900 per kw for large plants. To be competitive, even under conditions of favorable nuclear fuel costs, capital costs must be in the order of $200 to $300 per kw. This is a challenge to ingenuity in the design of reactor systems.

Today's estimates of nuclear fuel costs necessarily vary with the reactor design, but are in general high and of the same order as chemical fuel costs which run about 2 to 3 mills per kwh. Since it seems that reactor capital costs will tend to be high, the nuclear fuel must come down in cost and to the order of 1.0 to 1.3 mills per kwh. Because of the highly concentrated nature of nuclear fuel, there is a very great opportunity for technological improvements to give significant reductions in present estimates of fuel costs.

Capital costs and fuel costs must, of course, be considered together for each reactor system in determining the power cost. Even the most optimistic estimates announced to date for the cost of power produced by nuclear fuel are generally in the range of 10 to 20 mills per kwh. Such costs are for large plants and assume long and reliable operation.

Experts in the industrial reactor branch of AEC are hoping for 8 mill per kwh costs by 1960, with a further reduction to around 6 mills by the year 2000.

The day of economic nuclear power will be brought closer not by any one

World Reserves of Fossil Fuel and Nuclear Energy

FUEL	World reserves	TOTAL ENERGY BTU
COAL	3,482 billion tons	72.2×10^{18}
OIL	1,241 billion barrels	7.6×10^{18}
GAS	560 trillion cubic feet	0.6×10^{18}
TOTAL conventional		80×10^{18}
URANIUM	25 million tons	$1{,}700 \times 10^{18}$
THORIUM	1 million tons	71×10^{18}
TOTAL new fuel		$1{,}800 \times 10^{18}$

Problems/Types	Graphite Sodium Cooled	Pressurized Heavy Water	Pressurized Light Water	Homogeneous	Fast
Fuel utilization	4	2	5	3	1
Processing	4	3	4	1	2
Capital Cost	2	3	1	4	5
Revenue	2	5	4	3	1
Safety	3	1	2	4	5
Engineering difficulty	2	3	1	4	5

Culbert Leggett

Maytham Walker

Rosenberg Slipher

trend or activity but by several. These are the reduction in reactor capital cost, the reduction in nuclear fuel costs, and an increase in the cost of fuels that cannot be overcome by increasing efficiency of conventional steam plants.

Another major obstacle to the immediate development of atomic power will be found in the provisions of the existing Atomic Energy Act of 1946. Until the act is amended in certain very substantial parts, there will be no privately financed nuclear electrical power.

Under the provisions of the existing act, private ownership and use of such facilities as the reactor and chemical processing plants for fuels are prohibited. In addition, the private ownership of all fissionable materials and access to raw materials are prohibited.

There has been some progress toward overcoming these legal difficulties which arise from the Atomic Energy Act. The President has made to Congress certain recommendations for changes in the Atomic Energy Act, which would tend to overcome the major objections in the present act that serve as a deterrent to private enterprise in developing nuclear power. These recommendations by the President are understood to have the support of the AEC. It can safely be predicted that if Congress adopts these changes, the new law will provide the necessary incentive to private enterprise to move more rapidly into the field of atomic power.

With today's status of atomic power in our minds, we can attempt to draw conclusions as to when commercial atomic power will first become established in this country. Many estimates or predictions claim that it will become competitive with power from conventional plants by 1960 and that by the turn of the century a large percentage of our electrical energy will be developed from atomic energy. This certainly could be possible when you consider the rapid developments in technology to date, and the added impetus that would be given the entire program with the resolution of the present legal obstacles which now restrict the activities of private enterprise. There is certainty that in time most of the technical and nontechnical problems will be solved, and then competitive atomic power, privately developed, will take its place with today's conventional power sources in providing for a future America and the world.

The Builder Attacks the Wiring Problem

". . . quite probably the very customer I am worrying about can't buy my house."

D. C. Slipher
Technical Director, Fritz Burns & Associates
Los Angeles

A revolution has taken place in the home building industry. Today 80% of the houses are built for sale, like merchandise on the shelf. Thus the builder makes the decisions in advance for unknown customers and competition dictates that the decisions he makes had better be right. He is like a department store buyer, who must pick the merchandise that will sell.

In 1953 there were 268 builders out of a total of 38,000 who built 20% of the nation's total of 1,200,000 homes and 680 accounted for up to 50%. These are the builders who are affecting the living pattern of people who live in their houses for years to come.

That the electrical industry has not made the right approach to builders was the point made by Dave C. Slipher, technical director of Fritz Burns & Associates, Los Angeles, and chairman of the construction committee's subcommittee on interior wiring design of the National Association of Home Builders.

He maintained that the industry has not appreciated the builder's problem as it involves the appraisal and lending policy of the FHA, VA or other financing agencies. He also maintained that the adequate wiring promotion had tried to do too much and that much of its effort was thus misdirected.

Last October, for the first time the National Adequate Wiring Bureau, he said, had approached the National Association of Home Builders on an official basis. Before this they had been shown slide films addressed to the consumer instead of the builder. Since that meeting a new appreciation has been reached on the matter of financing. It was shown to the NAWB that the added cost of adequacy does not become reflected in the loan but in the down payment. As such it seriously affects the market. The NAWB was then asked to approach the appraisers and financial agencies, to whom the subject of wiring adequacy was "so much Sanskrit."

Builders, he said, are like auto dealers or appliance dealers. They know too well that small increases in down payment requirements restrict the market. They say to themselves, "I should put adequate wiring in, my customers will need it, and should have it, but since my lending institution does not include it in the loan, my market will be restricted, and therefore quite probably the very customer I am worrying about can't buy my house."

Since the October meeting, a subcommittee of the construction committee of NAHB has been established to work with the NAWB committee on interior wiring design to establish a voluntary national standard or base for at least a proper service entrance

and to gain recognition of its cost by the financing agencies. This brought a fresh approach to the problem and the voluntary standard, shown in an accompanying box, has been the result. This was submitted to the directors of NAHB in Washington, D. C., and on May 17 it was accepted unanimously.

"Now I don't have to tell you that means we have got the door open. However, it is a long way from getting the over 3,100 members of NAHB to accept it. We have established a moral standard to be followed and I think we will get further with that than if we had codes and said they would have to do it."

Slipher then told of the program to follow through being initiated by the home builders. He urged very strongly that the electrical industry gird itself for action to follow through likewise and to sell builders and appraisers on this voluntary standard. He urged that the key utilities in various cities prepare physical samples of the service entrance equipment and that these be used as a basis of discussion with local builders groups, appraiser groups, FHA and VA.

"The electrical industry can also greatly improve its relations with the building industry and home builders by policing itself in uprooting and getting rid of umbrellas in building ordinances that result in increased costs of residential and commercial wiring without aiding basically to adequacy or performance. As an example, the city of Los Angeles persists in retaining as a code requirement, with local electrical industry support, restrictions as to the use and acceptance of nonmetallic sheathed cable," he said. "This adds not less than $60-80 cost for a typical residence when it is required to be in conduit. Just pause and think how much more wisely these dollars would be spent in adequate service entrance equipment, larger wire sizes and more circuits. Under these circumstances is it any wonder Los Angeles builders are a bit skeptical and restrained in their enthusiasm for the adequate wiring promotion?"

Slipher also pointed to the big stake the electrical industry has in the rehabilitation now being undertaken by the NAHB. With meter readers and public contact people calling on customers, he felt that utilities could be very helpful in suggesting to customers that if it makes sense to have shoes half-soled it makes sense to have their homes modernized and brought up to date.

The program is large, since it means the upgrading not only of individual homes but of whole neighborhoods and hence concerted action is necessary. "The old house has in it space which is at a premium these days. We need to preserve that space and make better use of it. These old homes are in the downtown sections from which people are fleeing to the suburbs. In these sections you have the best distribution facilities and a large investment.

"What can you do about it? You can acquaint yourselves with this program. You can put teams together with us to go to work on it. If we get a really worthwhile program going, we can add $16 billion to our economy in this modernization program."

Faith in the Future

"We must be ready and willing to make any sacrifice to see that our way of life survives."

Virgil M. Pinkley
Editor and Publisher, The Mirror
Los Angeles

"Let's begin explaining what enlightened, progressive capitalism is and how it works, not only to the American public but to the people of the world.

"Let's remember that our dynamic economy was built by rugged, competitive free enterprise.

"Let's stop being order takers and start selling again.

"Let's get up and GO."

These were some of the challenges issued by Virgil M. Pinkley, noted radio and television commentator and editor and publisher of the *Los Angeles Mirror*, in a stirring address at the only luncheon session of the PCEA convention. Pinkley, who backs up his observations and opinions by on-the-ground investigations all over the

Voluntary Standard for Electrical Service Entrance
Approved by National Association of Home Builders

1. There shall be a three-wire 110/220-v "drop" from the pole to the service entrance head. (Across the country this is practically 100% the responsibility of the power company.)

2. From the servite entrance head to the meter and service entrance panel (box) run three-wire No. 2 service entrance cable or 1¼-in. conduit containing three No. 2 wires. (Approximate capacity 100 amp.)

3. The service entrance panel (box) shall provide for circuit breakers or fuses for at least eight circuits (preferably 10 or 12) and shall be so designed that at least two of these circuits may be three wires and equipped with circuit breakers or fuses *of up* to 50 amp capacity.

4. When the service entrance panel (box) is installed in a way which might require "remodeling" to utilize the spare circuits, provide two *"dead"* three-wire No. 6 cables or two *empty* one-inch conduits (rigid or flexible) as follows:

(a) One to an accessible location in the attic, the other to an accessible location below the first floor, or

(b) Both to accessible locations either in the attic, or below the first floor, or

(c) If slab construction, one to the attic and one to the equipment wall in the kitchen, *and* if both slab and beam and plank ceiling, then both to equipment walls in the kitchen or elsewhere in the house.

These provide for the heavy duty future circuits necessary for "added later" air conditioning, ranges, room coolers, dryers, home freezers, etc.

5. If there is an attached garage, run one *"dead"* three-wire No. 12 cable or *empty* one-inch conduit (rigid or flexible) from the panel (box) to an accessible location in the garage.

This provides for use of power tools, home freezer, or laundry equipment in the garage. In some cases, what is recommended in No. 4 above can be arranged to take care of No. 5.

Further, in two test cities (Detroit and Los Angeles) FHA and VA local offices have agreed to establish valuation increases to cover the added cost of what is above outlined.

Cady Sues

de Waard Kobler

Karsten Warren

world, summarized national and international problems and came up with the conclusion that what industry, business and the public needs is "to believe in and have faith in the future of America."

Reporting on some of his most recent visits he commended the complete change in political atmosphere in Washington, D. C., where a new sense of urgency, responsibility and dedication actuates those who direct national welfare. Necessary and long overdue housecleaning has tended to eliminate waste and inefficiency, he said. Along with this is a recognition of moral and spiritual values, which he pointed up with the story of how Ezra Benson became Secretary of Agriculture.

On the international scene Pinkley observed that it is easy to overestimate an adversary or to underestimate what is being done to combat one. Expansion of NATO forces, establishment of new air and naval bases and alliances with Turkey, Greece, Pakistan and Spain were helping to contain the Communists in his opinion. The fact that Russia has available to it only 7% of the world's petroleum resources is a deterrent against a potential World War III.

Pinkley insisted that America is reaping a harvest in the Orient that was sown in Korea, where diplomats rather than military men ran a war in which the determination to win was lacking. Orientals cannot understand, he said, how America with its tremendous resources and with the backing of 15 other nations, could not defeat 6,500,000 North Koreans. Because the U. S. does not try to win the minds and souls of men, it is losing ground in the Orient, in his opinion. He said that technical help and education in the development and utilization of the resources of Asiatic nations is badly needed. The wonderful example of what this country did to help the Philippines become an independent nation with a great educational system and progressive industries has not been used effectively in our diplomacy.

"Millions of Oriental people are sitting on the fence waiting to choose between the Russian slave world or our free world," he said. "We need to marshal some moral and spiritual values to win them over.

"We must be ready and willing to make any personal sacrifice to see that our way of life survives in a free world."

New Outlook for Northwest Power Situation

"Perhaps we could solve our problems . . . by selling out to the government. But if they get it, they are going to have to get it the hard way."

Kinsey M. Robinson

President, Washington Water Power Co.
Spokane

"The problems we have in the Northwest could probably be solved as they were in the TVA by selling out to the government but up in our area we don't feel that way. They are going to have to get it the hard way if they get it at all," said Kinsey M. Robinson, president of Washington Water Power Co., in bringing the convention up-to-date on the Northwest power situation.

Robinson described the role the Northwest Power Pool had played in weathering the utilities of the region through the critical shortage years. He reviewed the familiar history of the formation of the pool and participation in it by the private and municipal utilities and Bonneville Power Administration. He differentiated between this pool and others in the country in that it is integrated so that each company has to give up management of its machines to the pool and even the down time for maintenance has to be scheduled by the pool.

As of March 1 of this year, the pool had 7,084,000 kw in operation and 3,893,000 under construction. But the region must start from 3,000,000 to 3,500,000 kw to get 2,000,000 kw of dependable capacity for the next 10 years. There are 45 new projects under way with a total of 8,359,000 kw, of which 3,636,000 will be needed in six years or longer, and 4,723,000 within two to six years.

Until the present administration, he said, all of the hydro power sites in the Northwest were expropriated by the federal government and the private companies were not allowed to build anything. Since the new administration has notified the industry that it could come in and take as much responsibility as it would, a new lease on life has been evidenced in the private companies.

"We have got to move and move fast if we expect to carry the load that will come upon us. It is hard to keep government plants on schedule but we have shown that we can do it in our own projects," he said.

Of the Priest Rapids' plan in which it is proposed that there be 21 partners, he said it would probably end up by being done by the State Power Authority. He was not inclined to feel that private companies could go in with the PUDs for fear they would wait until the project was finished and then take it away from them.

"If it is a case of one horse to one rabbit, we are not too much interested, but if the horses are to be of the same size and carry about the same amount of pull on the load then it is another matter," he said.

Robinson outlined briefly the projects contemplated by the Puget-Cas-

cade group of Seattle, Tacoma, Puget Sound Power & Light, Snohomish and Chelan PUDs, the Cowlitz project of Tacoma and of his own company's Cabinet and Noxon plants. The Cabinet and Yale plants are the only plants private companies have been permitted to build in the past 20 years.

Despite obstacles that he described, the Cabinet plant had been rushed to completion last year because they had received a lot of help from every government agency rather than hindrance usually found.

Five companies have organized a generating company, known as Pacific Northwest Power Co., to build some $300,000,000 to $500,000,000 worth of projects and are now studying sites on the Clearwater River.

"I suppose we'll have a rassling match before we get permission to go ahead on these," he said. He declared that public sentiment was changing in the Northwest. A REA in northern Idaho has gone broke and Washington Water Power Co. has offered to buy it on good terms. PUDs have gone to court to prevent the private company from bidding on it, so a poll was taken of the customers of the REA and 84% signed a petition declaring they wanted to receive their future service from the company.

That all the industry should get up and defend the administration now that it is being fair and is trying to do right by both private and public groups was his closing plea. "If we use the same energy and language to defend those who are doing the right thing, we would get a long way with the public," he said.

As to the future, with the projects mentioned completed, hydro will have about reached its limit in the Northwest and steam or other sources of power must be found, he declared.

Johnson Longley

You and Your People

"It involves getting the other fellow to do what you want him to, in a way you want to, and so that he wants to do it that way."

William G. Caples
Vice-President, Inland Steel Co.

"Are we getting to our people? Are we convincing them?" asked William G. Caples, vice-president, Inland Steel Co., in the closing address of the Friday session. In a few years, he said, the relationship between management workers and production workers has changed greatly. Management has spent a lot of money to bring people to a viewpoint and to create an attitude, that:

1. Our free choice competitive economy produces a people's capitalism that is the best in any society because it gives more goods and services to more people than any other type of economy.

2. Our companies and the way we run them with great possibility of vertical mobility within an organization is best.

3. Telling our production workers our problems will bring them to a sympathetic view of our actions and the necessity for them.

"We do these things because we are sure what we do is right," he said. "Our people are a lot of people; our workers and their families, our stockholders, the people in the communities where we live, our customers. Are we getting to them? Are we convincing them?"

Caples mentioned the *Fortune* survey titled "Is Anybody Listening?" which concluded that "they weren't." He asked whether this indicated a failure or that it was time to re-evaluate the approach.

Essentially, he said, there is no difference between the machines, methods and processes of one manufacturer and another in any industry. The only variable is the people in the company and thus the only competitive advantage is how well or how badly he directs their efforts. If they do not support him, it is because they do not find working a satisfactory experience.

He simplified the usual technical terminology of psychology by saying that the meaning of human relations has to do with how people get along with each other. It involves understanding of what the other fellow wants and why he wants it, and what he does and why he does it. From the supervisory level, the one with which most of those in the audience were confronted, it involves getting the other fellow to do what you want him to do, in a way you want him to, and so that he wants to do it that way.

In evaluating how well industry had done in this job, he said the surveys made showed shockingly meager accomplishment. Even technical employees, such as research workers and engineers, he said, show a degree of frustration that is surprising.

Countered to such indications of failure, he said, it was encouraging that management can be critical of the things it is doing and is taking the care to analyze them.

Assistance of universities and psychologists is being sought to investigate the importance of (1) personal rewards, such as pay, employee benefits, status recognition, opportunity for growth, etc.; (2) immediate supervision, and the relationship between supervisor, his competence, and the security of job and work relationship; (3) company operations, as they affect competence in management and adequacy of communications between management and worker; (4) physical and mental demands of the work, such as working conditions, status and recognition; and (5) job satisfactions, both in work relationships and integration in the organization.

He finished by giving examples from his own experience that were very pertinent. He spoke of the integration of minority groups and the matter of politics. On the latter, he said, "I think experience has shown us that the American worker is a discriminating voter—that he votes the way he believes right and not the way someone tells him to vote. Time and again the unions have made the mistake of trying to dictate to their membership in a public election situation and almost without exception the members have not followed their leaders where the same people follow almost blindly in an industrial matter." The case of the overwhelming vote for Senator Taft was cited as a prime example.

"If we are to be successful in preserving the type of strong economy that we want and in getting the laws passed that we believe wise, we are going to have to create an atmosphere of belief by people that the things that we advocate are in the long run the best for them and for all people," he declared.

Corlette Chapman

Annual Meeting

Informality and casualness, characteristic of President Pengilly, was the pattern for the annual meeting to terminate the convention.

Treasurer J. F. Pollard, PG and E, briefed his report by assuring all that the association's financial condition was good. He likewise reported that the directors had taken a step they should have taken a long time ago and established a pension plan for its employees. In order to do so it had been necessary to set aside a considerable sum to bring the program in line with that of most of the member companies.

Victor W. Hartley, managing director, likewise made a condensed report in which he mentioned the Hawaiian Section meeting as an outstanding event of the year. Future meetings of the Hawaiian Section, he reported, will now be held every second year with interim meetings of the section workshop committees.

The home economics committee booklet, he said, was adopted by Edison Electric Institute in its entirety. He also spoke of certification of 517 adequately wired homes in the Edison company territory and of cooperation with the National Association of Home Builders on its program. The code and ordinance committee had brought out a 1953 edition of the uniform electrical code and obtained attorney-general approval. The school lighting committee project is under way and progress is also being made by the highway lighting committee's technical subcommittee. International recognition has come to the Standard Safety Rule Book with requests for copies from all over the world. Membership of the association has reached over 4,000 individual members and 300 company members. Particular praise was given to the 4-H electric project committee for the accomplishment during the year.

George Coughlan reported for the Administrative Services Section. He told of the two joint meetings with the PCGA in Hollywood and Berkeley and listed the working committees and their projects. He recommended a new committee to study the value of pennyless accounting. The uniform records retention system studied and advocated by the section had been adopted by several Western utility commissions, he said. His recommendation was that a committee review the specifications and purchase contract procedures by various companies and that a procedure be developed for approval of delegates to attend conferences.

Walter Chapman, chairman, Business Development Section, made a report of the 10 regional meetings held by that section. (See ELECTRICAL WEST, May, p 94.)

L. M. Longley, Engineering and Operating Section, gave a brief report of the San Francisco conference of this section, attended by 763. His one suggestion to be made to the board of directors is for a committee to study circuit breaker reclosing practices.

The nominating committee, headed by W. C. Mullendore, Southern California Edison Co., brought a recommendation for Roy N. Dreiman, Coast Counties Gas & Electric Co., as president and the re-election of H. F. Hartzell, Maydwell & Hartzell Inc., San Francisco; L. A. Hicks, Hawaiian Electric Co., Honolulu; R. G. Kenyon, Southern California Edison Co., Los Angeles; Walter J. Maytham, Westinghouse Electric Corp., San Francisco; T. L. Rosenberg, electrical contractor, Oakland; Henry B. Sargent, Arizona Public Service Co., Phoenix; Sam W. Scott, Graybar Electric Co., Los Angeles; F. A. Tracy, Sierra Pacific Power Co., Reno; Ray W. Turnbull, General Electric Co., San Francisco; and Marshall Lasher, Hubbard & Co., Emeryville, as directors. The recommended officers were unanimously elected. In a later board meeting vice-presidents were selected as follows: Charles Goodwin Jr., San Francisco, L. A. Hicks, Honolulu, Henry Sargent, Phoenix, Sam Scott, Los Angeles, and Frank Tracy, Reno.

In accepting the presidency, Roy Dreiman expressed appreciation and announced that his company, which had been in existence 40 years, would soon be merged with Pacific Gas and Electric Co. and that its members would still be members of the association but under new management and all were happy about it. He declared that the theme for the new administration would be to amplify the slogan on the medallion for Light's Diamond Jubilee by making it read "Increasing light for freedom and expanding power for progress."

At the banquet, golf prizes were awarded and the traditonal three cups were presented to the following: the H. M. Byllesby cup to Guy Morrill, Midwest Piping Co.; the A. B. Day cup to Dick Pearce, Southern California Edison Co.; and the Pelton cup to A. A. Gingell, U. S. Rubber Co.

Arrangements and Entertainment

Unanimous, and expressed on many occasions, was the praise and appreciation accorded the convention committees for all the arrangements and entertainment. The always gracious and affable Leon M. Guibara, U. S. Rubber Co., as general convention chairman was truly an impresario for a grand show. His stage manager, Les C. Kohler, San Diego Gas & Electric Co., and the stage assistants anticipated and provided for all facilities. Sam W. Scott, Graybar Electric Co., as chairman of the attendance committee could point with pride to a total registration of 870, of which 330 were women. This taxed the Hotel del Coronado facilities but William de Waard's hotel committee managed to house nearly everyone in Coronado, with a few in San Diego.

The program was arranged by M. G. Sues, Sues, Young & Brown, Los Angeles, and his group. Reception committee was headed by D. P. Cady as chairman and D. P. Kruger was chairman of the registration committee. H. A. Cordes, General Electric Co., San Diego, handled transportation and general information. R. L. Engel headed the ushers committee, William O. Kyte that of publicity.

The entertainment highlights were a trip to Tijuana, Mex., to participate in the Jai Alai games on Thursday evening. There was a boat excursion and luncheon for the ladies on San Diego Bay, with luncheon at the Admiral Kidd Officers Club, arranged by C. A. Wikle, Los Angeles, chairman of the ladies entertainment committee. The ladies also had a luncheon at the pool at which a team of "frogmen" from the U. S. Navy Amphibious Base demonstrated underwater demolition techniques and use of equipment. This was arranged by Lloyd Wall, Coronado division manager, San Diego Gas & Electric Co.

The climaxing banquet was preceded by a manufacturers and distributors cocktail party, over which E. E. Karsten, Gough Industries, acted as chairman. The banquet committee under N. K. Yarnell provided entertainment which was announced by Gar Morse, Sylvania Electric Products, who opened with a quartet from that company. H. S. Warren, chairman of the golf committee presented the prizes and cups. San Diego Gas & Electric Co. provided much of the staff.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Delayed accolade

Briefer than ever this month! Too many conventions to report. But first an orchid to John Walsh, Pacific Gas and Electric, and his hard working committees who did such an outstanding job with the IES regional conference in April. Watch for details on the "Celestial Room."

Another upward round

Eleven out of 36 cases to the Council on Industrial Relations were from the West — Alaska, Billings, Kalispell, Oakland, Pasco, Richmond, Sacramento, Salt Lake City-Ogden, San Diego, Stockton and Vallejo. If the decision in the Oakland, Richmond, Vallejo and San Diego cases was the pattern the Council granted wage increases and health and welfare where it was asked and eased some of the travel, height pay and tool insurance extras the unions asked for. Oakland got a 7½c wage increase effective July 1. San Francisco and the peninsula were waiting to see what Oakland got. Richmond is unhappy, getting only parity on health and welfare and vacations but no pay increase. Los Angeles settled for 10c now, 5c next year; Sacramento 12½c, making its scale $3.20, the same as Los Angeles. San Diego got 10c wages, 7½c h&w. More details as the decisions are made public next month. The AGC upping the other trades and Los Angeles settlement evidently influenced the Council despite lack of economic justification.

Scare operators

Fraud and misrepresentation were charged by California State Contractors License Board against Insured Electric and Associated Electric of Oakland in hearings June 1-4 to revoke their licenses. They are charged with using salesmen posing as power company or city inspectors to survey and condemn wiring with a flashy gadget, then sign up for rewiring.

Easy payments

Important wiring news in this issue includes National Association of Home Builders voluntary service entrance requirements for tract homes (see p 112), Residential rewiring and installation financing plans by Arizona Public Service Co. (p 101) and Portland General Electric Co. and that General Electric Finance Corp. may soon have a wiring financing plan (p 134). Pacific Gas and Electric is also working on a plan for northern California. Even Life magazine now talks of wiring adequacy.

NECA Districts 6 & 8 meet

Both District 6 and 8 NECA meet at Reno's Mapes Hotel on June 24-26 with a packed program of contractors' problems. Don Clayton, president, Paul Geary, executive vice-president, and Charles Simpson, District 8, Ed Buttner, District 6, and Fred Oertli, District 7, vice-presidents, will participate, as well as E. R. Cornish, research and education director. Program includes breakfasts Friday of the California-Nevada, the Northwest and the District 8 conferences of chapters; a panel on Thursday on reorganization plans for National Electrical Contractors Assn.; another on luminous ceilings Friday; a line constructors luncheon; one on apprenticeship training led by Oertli; another on research and education; a general report on NECA by Geary; a labor relations panel session with E. B. DeFeyter as chairman. Saturday's luncheon will be addressed by Oscar Harbak, IBEW District 9 vice-president, and by Wallace Wright, IBEW District 8 vice-president. Featured also will be the General Electric Co. Lightorama at a manufacturer's exhibit. Vice-presidential nominations for Districts 6 and 8 will be made. It is known Phil Robbins of Salt Lake City will be nominated for 8. Ed Buttner was undecided whether to run again for 6. F. E. Stanton, president of the Nevada chapter, and Jim Jeffers, manager, are in charge.

Show dates

Big shows coming up—Western Plant Maintenance Conference and Show at the Pan Pacific auditorium, Los Angeles, July 13-15, with L. C. Morrow of Factory magazine as conference chairman. Los Angeles Home Show is holding sway at the same place June 10-20, featuring an all-electric remodeled residence. Western Electronic Show and Convention will be there and at the Ambassador Hotel, Aug. 25-27.

ELECTRICAL WEST

Sales Guide

News Letter

June 1954 ©

FOR THE ELECTRICAL MERCHANT OF THE WEST

Is UHF getting the same kiss of death that FM got? There's a big battle brewing over it in FCC, with Frieda Hennock lining up with the UHF licensees who complain they can't get network programs because of a VHF freeze-out. Commissioner Hennock advocates putting all TV on UHF and freezing of the 13 VHF bands to other uses. Fireworks are flying.

No gold in the rush

Another national battle is over getting Congress to enact fair trade for District of Columbia where discount mail order houses operate from behind the Yalu to bomb fair trade in other states. An association of discounters is shedding crocodile tears for the public in bucking it.

Stop the snipers

Unable to conduct a legitimate dealer business in competition with Los Angeles discounters, well-known dealer D. C. Culbreath has turned his store into a discount house, he advertises. Will respect fair trade items and feels manufacturers have shown they'll sell to anybody so he will pioneer no more; just ride the nationally advertised train.

Joins 'em

Some of the give-aways being screamed in big ads and over radio are a little like offering a horse free with every buggy whip. The public must get the idea that nothing is worth what is asked for it and that big bait is necessary for manufacturers to dispose of surpluses. . . Other than this the appliance retail situation is not as bad as it was feared it would be early this year. It is about the same as last year.

What is a price?

General Mills has given up the appliance business with the sale of its appliance equipment, tools and inventory to Illinois McGraw Electric Co. The move resulted in a dumping of General Mills appliances to move an inventory of over $1,000,000. . . Arvin Industries decided to drop coffee percolators, irons and toasters from its line and turn production facilities over to a new window fan and to two new unannounced products to be sprung in July and October.

Drop lines

While June 6-12 was selected to spearhead a national drive to remove discarded refrigerators and freezers from hazard to youngsters it is a drive that should not be confined to one week. Indeed, most Western cities have been scouring the area to remove locks and hinges.

Death traps

Color TV sales certainly have not been promising despite considerable advertising in reception areas. Ben Abrams of Emerson, who offered a lease plan, says the response even to this proves the public isn't ready for color with small screens and few programs. . . DuMont announced that 19-in. picture tubes will be in delivery this fall.

Color is slow

Prices drop

Prices are reflecting the market. Several TV makers announce new models at lower prices. . . Sears new midsummer catalog will show price reductions on practically all appliances. . . Whirlpool has shaved $41.95 from its 1954 automatic washer, now $188. . . Tropic-Aire reduced prices on two heaters. . . Westinghouse cut steam iron and roaster prices and took the latter off fair trade. . . International Harvester has readjusted prices on several models. . . Broil Quik made cuts on several models and offers a deal on accessories. . . These are typical of several more.

Strike season

Strikes and threats of them were plaguing several manufacturers. Philco had ten of its plants on strike at press time. . . G-E was threatened with a strike at its Louisville plant but it cleared up. . . U. S. Air Conditioning Corp. had a strike.

Manufacturer news bits

Murray Corp. has decided to quit making gas and electric ranges. . . RCA is separating its phonograph and its radio-TV departments for separate operations. . . Kaye-Halbert TV Corp., Los Angeles, is in trouble and going through either reorganization or receivership. . . Tecumseh Products Co., makers of refrigeration units used in a great number of freezers and refrigerators, opened a new plant in Oakland May 1, replacing the Emeryville plant destroyed by fire in February. Located at 1127 57th Ave., it's for the repair of Tecumseh units in the West.

Hot ammo

Bottled gas is bottled up very thoroughly in a new merchandising sales tool, designed to help dealers and salesmen point out to consumers the advantages of electricity. It has been put out by the utility division of Hotpoint Co. and is called "Electricity Versus Bottled Gas." It incorporates the tests made by the housing and household equipment division of the Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture.

Shot in the arm

Wonder if Frigidaire is having any trouble in the Deep South selling its colored line. Supreme Court action should help it. . . Seriously, though, Frigidaire is conducting a series of sales boosting meetings for dealer managements throughout the West. . . It also has a colorful new booklet telling of its role in conditioning air, water and food, "Our Business Is Being Useful."

All 60 cycle now

Last 25 cycle in the country is being switched over to 60 cycle by Arizona Public Service Co. at Superior, Ariz. At a cost of some $350,000, the company is changing over all appliances free to its customers. It is converting for dealers free or giving them a credit on the cost of converting to buy a new one.

Pay for it now

Electric heating use stopped rather abruptly when metering was put on for domestic consumption in Richland at the Hanford Atomic Energy village. Previously, on flat rate even a plea to cut use during a critical power shortage was not heeded. Yet the G-E study shows at Northwest rates electricity is only 1.5 times as expensive as oil or coal.

Band wagon

Promotions ahead: A refrigerated air conditioning promotion is on in Denver, sponsored by the Post and sales and promotion committee of RMEL; 19 distributors donated a window unit to the contest, two given away each work-day of a 2-week period. W. L. Duncan, G-E Supply, is chairman of the steering committee. . . Montana Power plans a fall lamp bulb and certified lamp campaign direct mail to its customers with an employee-testout drive earlier. . . Northern California Electrical Bureau is getting ready for a big promotion in October, coincident with the national publicity on Light's Diamond Jubilee.

Speaking of lamps, the 10th California Lamp and Picture Show will be in Los Angeles July 11-15, coinciding with the furniture show July 12-16. Main show will be at the Biltmore. . . San Francisco's Western Summer Market will be at Western Merchandise Mart July 19-23. — Light ahead

More lamp news: G-E has a portable lamp promotion package available from its lamp division at Nela Park for furniture stores and retailers of portable lamps. It will help to capitalize every lamp-selling opportunity. . . The Beauty-plus Lamp Council suggests a promotional pattern for lamp sales this fall, featuring the tagged lamps. — Ideas available

Home Lighting Workshop, conducted by and at San Francisco State College in cooperation with Northern California Electrical Bureau, starts June 28 and runs to July 2. Mary E. Webber, G-E, Cleveland, Edith Buchholtz, Westinghouse, Bloomfield, Jan Reynolds, Sylvania, and Naomi Shank, Iowa State College, have been programmed by Marguerite Fenner, PG and E director of home economics, for the course. Teachers receive upper division college credit but the workshop is free to decorators, consultants, architects and dealer salespeople. — Source training

Convention dates for the National Appliance Radio & TV Assn. in the West have been set. They will be San Francisco Sept. 17, Seattle Sept. 20, Portland Sept. 21 and Billings Sept. 22. A group from NARDA will make a tour to participate in each of the dealer conventions, according to Carl Hagstrom, San Francisco, vice-president. — Fall meetings

The RCA-Victor distribution has settled down. RCA-Victor Distributing Corp. of Southern California has taken over the Leo J. Meyberg Co. branch in Los Angeles and Harold Maag is temporarily in charge. L. A. Starkweather stays on in some executive capacity. In Fresno Edco Distributing Co. was formed with Edward Sarnoff, son of RCA's president. Edco also took over the Meyberg quarters there. In San Francisco the Leo J. Meyberg Co. continues with the RCA line. It expects factory news of the new lines in June. — Settles down

Other distributor changes are numerous. On the sad side, G. M. Popkey Co., TV and parts distributor in San Francisco, was in Chapter XI proceedings. . . In Salt Lake City the Glenn Earl Inc. stock was being sold in receivership sales. Glenn Earl died early this year. . . Carlos W. Stone Co. has been named distributor for Deepfreeze in the Utah and Idaho territory. B. G. Badger and Ralph O. Bradley are co-owners with Stone. Mountain States Distributors Inc. formerly had the line. . . Western Appliance Corp. of Denver has dropped the Kelvinator-Leonard line and will carry Zenith, Whirlpool, Magic Chef, Ironrite, James and Lewyt. Owners say they prefer not to have a full single line. . . Gough Industries closed its Fresno unit and will concentrate out of its Bakersfield warehouse. . . In a double take, Amana Refrigeration first appointed San Joaquin Valley Distributors Inc. of Fresno as its distributor, then a month later shifted to Don Anderson Inc. — Still fluid

Still more: In San Diego, Bob Covell, former manager for Century Distributing Co., took over Packard-Bell distribution which L. J. Frinchaboy Co. handled formerly. Joe Faringer took over at Century Distributing. . . Thor, formerly handled by Kierulff & Co., when it was taken over recently by Ed and Carl Nystrom, is now handled by Electric Supplies Distributing Co. in San Diego. Nystroms handle Motorola and Amana. . . Jerry Achtenhagen & Sons Inc. became RCA distributors in San Diego May 17 with Bert Jones, former Meyberg man, going with the new firm. . . Southwest Wholesale Radio has moved to larger quarters at Second & Madison in Phoenix. — San Diego region

More changes

In Portland, Schafer-Wright Inc. has shifted lines. It will now concentrate on Raytheon TV, Apex laundry equipment, and drop Magic Chef, Youngstown Kitchens and Royal cleaners. L. M. Johnson Co. picks up the Youngstown Kitchen distributorship for Oregon. . . In San Francisco, Pioneer Appliance, the Youngstown distributor, has taken on Speed Queen for northern California. . . Hallicrafters announces Graybar Electric as Denver distributor and George W. Davis, 5259 Beverly Blvd., Los Angeles, represents the company in communication sales for southern California, Arizona and southern Nevada. . . In naming Kenneth J. Dahm as manufacturers' representative, Proctor Electric Co. also announced Zork Hardware, Phoenix, El Paso and Albuquerque, Morey Mercantile Co. and Hasco Inc., Denver, Salt Lake Hardware and Strevell-Patterson Hardware, Salt Lake City, and Idaho Hardware & Plumbing, Boise, as distributors. . Dick Ruecker and Andy Anderson are new distributors of Thor equipment in Phoenix. . . In San Francisco Oscar Hammons Co. has taken over the John E. Amberg Co. area for distribution of Packard-Bell. . . Reliable Steel & Builders Supply Co., Los Angeles, is the new York air conditioning distributor for southern California. . . E. Prichett Inc., Salt Lake City, is now Arvin distributor on radio and TV. . . Thompson & Holmes is distributor for Remington window air conditioners in San Francisco. . . Vernon Newell distributes Bell-Aire coolers in Tucson.

People too

Maybe you've heard: Robert F. Harnish has resigned from Deepfreeze after seven years, lately as Western regional manager, to affiliate with Hawaiian Wholesale Factors in Honolulu as of July 1. The firm represents Deepfreeze, Hamilton and Calcinator in the Islands. . . Dave Salisbury, WESCO vice-president, retires, and will make his residence on San Juan Island near Seattle. . . Dale Kelly has been made district manager for California for CBS-Columbia with headquarters in San Francisco. . . Robert O. Blaine becomes the district sales manager for Revco Inc. for Oregon, Washington, Idaho, Montana, Utah and Western Canada with headquarters in Portland, and Stanley Wright of New Westminster, B. C., as special representative in Canada. . . J. E. Jones has been made district product manager for Hotpoint, San Francisco office. . . Bob Sloan, former district manager of consumer products for Westinghouse, San Francisco, has resigned. . . Eldon N. Dean, who left in 1952, has rejoined F. B. Connelly Co. of Oregon as vice-president and general manager. He was once with Flint Distributing in Salt Lake City, later with Kelvinator. . . William L. Shearer has become appliance sales manager for Robert L. Rice & Co., Crosley-Bendix distributor in Portland. He had been with Appliance Wholesalers and previously with Harper-Meggee and was Avco's Western district manager.

Mainland calls

In Honolulu the resignation of L. D. Leflar from American Factors Ltd. to return to the Mainland caused a number of shifts in the executives of that company's merchandising and wholesale operations. Otto Ludewig was made general sales and merchandise manager of wholesale operations. He had been with the appliance department of W. A. Ramsay. George A. Rinker was promoted to manager of the appliance department.

More moves

R. F. Spangler, who has been district service manager for the Pacific Northwest for Westinghouse Appliance Division's laundry equipment, has been taken to Mansfield as a national sales representative. . . And Ray H. Galyon, formerly specialties manager for Westinghouse in Seattle and then Pacific Coast manager for Free Sewing Machine Co., Beverly Hills, is now heading a newly created district managership for portable appliances in Oregon and Idaho. . . T. H. Biglieri of Kaemper & Barrett, San Francisco, won a round-the-world tour for Hallicrafters one of three national winners. . . Norman Hall has been put in charge of dealer services section of B. C. Electric in Victoria.

With sales managers lined up Northwest Electric Light & Power Assn. Business Development Section conference shows the way to...

Bring the "Bull Session" Into the Open

Climax of two and one-half days of talks on every phase of getting back into an aggressive sales stride in the Northwest was the final morning's sales managers panel shown above. With it Kimball Jack, Washington Water Power Co. sales and promotion manager, its instigator, brought right out on the floor those questions usually sounded only in "bull sessions" in hotel rooms. And with this penetrating device the sales staff people down the line were able to get frank answers from the sales bosses on their attitudes toward these pertinent questions:

The Quiz

- **How can we prevent future sales cuts in sales budgets?**

The best answer—By doing such a good job it sells management.

- **What is the best way to check sales performance?**

A—By good supervision—and training—and stimulating of the sales force.

- **Do salesmen need special rewards to make them produce?**

A—Recognition and appreciation are the best incentives.

- **Should the utility subsidize dealer sales?**

A—Call it what you will, they should help advertise, promote and sell.

- **Should home service advisers canvass and sell appliances?**

A—For those who merchandise, yes. For those who do not, they certainly must sell the uses and electrical living ideas.

- **Should utilities repair appliances?**

A—Differences in policy reflect an area's supply of capable private service shops.

- **Who is to blame—supervisors, managers—or the president—when sales results are poor?**

A—Supervisor and sales manager. They must direct and stimulate.

- **What kind of training fits our salesmen who do not merchandise?**

A—Basic selling, company rates, policies, promotional methods, free enterprise.

- **Where does the electric association fall down, and what will make it more effective?**

A—It doesn't fall down if it is given real support and generous participation.

Although not designed as such, this lively panel echoed the subjects covered in both the general and the bureau and committee parallel sessions. The stunt was further enlivened by: (1) A last-minute switch of questions so the managers, who had prepared answers to the former ones, were on their own. (2) Two stenographers rode herd on the bosses. One selected who was to answer; the other timed him. At least three managers were called on to answer each question. (3) The call for an answer came from the floor. On a mimeographed form the questions were numbered. (4) As the question was called a picture was flashed on a screen illustrating someone asking the question in a different form.

However, the managers should have been well informed. For two days they had been given a strong course from some 30 speakers on almost every angle of every subject.

To brief such a fully packed conference suppose we classify the notes taken during the entire session under these headings:

Supply of Power to Sell

A. W. Trimble, president of Mountain States Power Co. and of the association, quoting the inscription "What is Past is Prologue," said it meant "You ain't seen nothing yet."

"The achievements that will flow out of the technology and skills of the coming generation may very well make the progress of the last 75 years look small indeed by comparison.

"One frontier that is virtually racing in upon us today is the prospect of a radically different world based on atomic power. Who can predict what the taming of the atom may bring forth?

"Before us, too, lies the challenging task of harnessing the source of all earthly energy—the rays of the sun over head. Some day, as sure as the world, the secret of converting solar energy into electric energy will be ours and what that holds for the future we can only speculate upon today.

"Make no mistake about it—great things lie ahead. The field for the sale of electric energy is comparatively un-

Trimble McGonigle

Kennedy Ball

Taylor wins the prize

explored. The maximum use of electricity has not even been approached. Electricity is unlimited."

Robert Ball, assistant to T. E. Roach, president of Idaho Power Co., substituted for him as Roach was in Washington on the Hells Canyon hearings. Of the Hells Canyon situation, Ball gave a clear picture and expressed amazement that some of the other companies in the Northwest have not taken a stronger stand on this controversy because the same group fighting it has also declared war on private development of all other Northwest projects. Because Congress has never authorized any project "the fact is that there will be full development of Snake River by the Idaho Power Co. or nothing. The Hells Canyon association would rather have nothing."

All declared the company and its area had been able to meet all demands. It had constructed six hydro plants, increasing its total capacity four times; gone on the money market and in seven years obtained $100,000,000 for new construction. Recently it went to Utah Power & Light and contracted to take excess capacity from the new addition to the Gadsby plant to assure a sufficient capacity until such time as the Hells Canyon issue can be settled. Tremendous increase in irrigation pumping in the area is bringing need for another doubling of capacity.

Kinsey M. Robinson, president of Washington Water Power Co., at the conference's closing luncheon said that the industry had a great future except for one thing, "How are we going to get a power supply?" He said that Raver had stated that by 1970 all of the government power in the Northwest would go to the public bodies or the aluminum companies. "What that means is that if we are to stay in business we are going to have to get more power." He said it would not be cheap power because the cheap sites had already been developed. Much would have to be steam. He described the formation of the five-company partnership for development of power. Then he announced that the Atomic Energy Commission had authorized these five companies as a research group, by invitation, to undertake a study as to the feasibility of atomic power generation for the area. "If we can bring this power source within a reasonable cost we will then have the means to get power without fighting over whether we will be allowed to spend money in the development of these rivers," he said.

The Value of Teamwork

D. J. McGonigle, Montana Power Co. general commercial manager and section chairman, announced the theme of the conference "The Value of Teamwork." The three-quarters of a century of the industry had been a monument of teamwork.

As he closed the meeting he said, "Teamwork built this industry. Teamwork can preserve it. Now let's go home and go to work."

Robert Wilkinson, manager, Inland Empire Chapter, NECA, declared that just as the power resources of the region were being pooled so the sales forces of the industry could be pooled for better effectiveness in the region. In a very realistic, yet constructive, way he showed the difficulties in obtaining industry cooperation. He reviewed what could be done by an electrical league or by special bureaus on adequate wiring, farm electrification, better lighting, etc. The day-by-day opportunities to pool resources and cooperate required eight qualities: (1) Application of the Golden Rule. (2) Modest leadership instead of domination. (3) Faith in the ability and willingness of the rest of the industry to cooperate. (4) Understanding of the aspirations, capacities and functions of the others in the industry. (5) An open mind about industry projects of the various groups. (6) Patience with the struggles and results. (7) Vision of the objectives. (8) Work to achieve cooperative results together.

Sales Opportunities Ahead

Mel G. Kennedy, once of Pacific Power & Light Co., now assistant manager of sales, marketing and public relations, Ebasco Services Inc., New York, brought a well-illustrated analysis of the economic aspects of the nation as a whole and the future prospects for electrical energy sales. "When we are ahead of the second best year in the history of the industry we are still plenty high," he said, summing up the economic situation. Problems ahead are in air conditioning load curves; house heating; federal power threat. With charts he showed that the industry is in a much better shape to weather either a depression or a major war; that it enjoys a continued confidence of investors so that financing is easier. Private companies will be able to finance any expansion needed by the nation, he declared.

Frank E. Bodine, manager, electric utility sales, Westinghouse Electric Corp., San Francisco, using a panoramic screen and three large projectors, told and illustrated his company's forecasts for the potentials in lighting and commercial and industrial power in the next 10 years. In the next 10 years lighting alone will account for more than the entire 1942 power output of the companies or 182,000,000,000 kwh. After discussing the potentials of each of the basic industries he said, "Our estimates indicate that with a constant labor force (more people but shorter work week, etc.) in order to obtain a 23% increase in physical output, industry must step up its use of electric energy 54%. This would result in a rise from today's high of 9½ kwh per man-hour of production to 15 kwh, and a rise in total industrial use of electric power by 1963

Regan Skelton

Plowman Horrom

to a point exceeding 400,000,000,000 kwh."

The Northwest area will have a minimum load requirement of 13,545,000 kw in 1963 as compared to 7,143,000 today.

George T. Bogard, General Electric Co., Appliance Division, Louisville, told what it would take to attain the objective of an average annual kwh consumption per residential consumer of 10,000, a goal some of the Northwest companies are close to reaching already. It will require not only all of the appliances and lighting but electric heat and the heat pump, he said.

The advent of natural gas in the area will become a very highly competitive thing and "when the gas company moves in, it not only takes the house heating load, it does a good job of grabbing off a large chunk of the cooking, drying and water heating load. Hence, the greatly accelerated rate of growth in kilowatt-hour consumption that has taken place in recent years in your section may be a little harder to maintain in the future. I am sure that it can be maintained, but I'm also quite sure that it will require greater effort and more sales expense — certainly more than .7 of 1% of total revenue, which is all that is being spent to develop sales by one company of this group."

Without relaxing any effort in sales of ranges and water heaters, he advocated consideration of the growth appliances such as electric dryers, freezers, dishwashers, room coolers and a new 40-gal water heater with two 4.5-kw interlocked heating elements, which out-performs automatic gas water heaters. The dryer is good for from 800 to 1,000 kwh a year, the freezer 650 to 850, dishwasher 400 to 500, room cooler 1,000 to 3,500.

Bogard ended by summarizing all the many ways to step up dealer sales, reach mass markets, develop the new building market, sell employees, finance installation and wiring.

Evaluating Salesmen

Al Gilbert, general commercial manager, Idaho Power Co., compared the complex responsibilities today of a residential and farm salesman to those in the 1930s and described his company's prospect card, sales report, division sales manager's record, monthly recapitulation and general office report forms used in rating and watching salesmen.

Mary Ann Gates, Montana Power Co. home service director, gave her rules for working with dealers and distributors and their salesmen to improve performance. This she divided into the personal selling method, the analysis of the customer's wants, generation of enthusiasm by daily sales meetings, demonstrations, user callbacks.

Evelyn Hansen, Utah Power & Light Co. home service director, described the many ways in which home service can build load. These included cooking schools, demonstrations, mass selling before church clubs and other groups, teaching youth groups, schools, lighting and wiring presentations.

Clem Stearns, publicity supervisor, Washington Water Power Co., declared that next best to direct selling by the utilities to get results would be to have a program in which all employees participated in new business activity. He described his company's incentive program for obtaining prospects and steering business to the dealers. Demonstrations of their own home electric equipment to neighbors was a feature of the program.

John Taylor, B. C. Electric Co., told how the most stable of all load, that of residential lighting, had fallen off because of lack of promotion. Even during depression years there had been least drop-off of revenue from lighting in homes than from any other type. The utility is the only one that can make a long-range program. With comparisons of the minimum home and the addition of slightly larger lamp sizes and a few additional lighting units the load could be doubled.

Builders and Wiring

How the equipping of new tract homes with electric appliances helped to build up the replacement market in old homes and sell wiring adequacy at the same time was shown by A. H. Jaeger, Hotpoint Co.

Guy Davis, Pacific Power & Light Co., outlined the utility company's duty in regard to promotion of adequate wiring by organizing the other branches of the industry. H. F. Koch, Electric Service Co., Boise, spoke of the contractor's duty in becoming more of a salesman of adequacy and of selling for tomorrow's needs. He, too, advised the organization of all branches to have a goal of selling. He also stressed the role of the designer and architect in the matter and the value of the National Electrical Code.

A farm wiring program that is constructive was described by Robert Wilkinson, manager, Inland Empire Chapter, NECA. Working with county farm advisors, utility farm counselors and contractors interested in farm wiring, an educational program to assist farmers to do their own routine maintenance work and likewise give them an appreciation of good residential and farm wiring practice is about to be initiated.

Joe Picatti, contractor of Yakima, stressed the use of simple language, simple diagrams and procedures to show farmers the correct pump sizes, wiring necessities, motor sizes, rate schedules, etc. He spoke from a practical experience and urged the elimination of all complications possible.

Rural and Farm Bureau

After a roll call of each utility as to what program they were carrying on, this group under C. A. Root as chairman held a panel discussion with T. Karl Dimmitt as moderator on the operation of farm work. Such questions as the number of calls a man can make, how much time to spend on reports, comparative values of individual contacts and mass selling, the value of irrigation business, sprinkler versus pumping, various motor drives, the value of pumping as a counter to winter peaks, how loadbuilding and public relations go hand in hand were covered in this session. 4-H, FFA and extension service programs were the subject of another panel discussion led by A. G. Mayer, Washington Water Power Co., the second day. The wiring for farm discussion above was also a part of this program.

Local Chairman Al Gilbert and D. J. McGonigle, Business Development Section chairman, opened in a Light's Jubilee setting

Frank Bodine, Westinghouse, illustrated his power prognostications with a three-screen color panorama of matched pictures

Electric Heating

Although this subject kept recurring in almost all of the meetings, it was in the rate research committee, headed by Duane H. Olney, that a low-down discussion of the cost of serving electric house heating was had. Recent rate studies and load studies were discussed as well as residential load factor with and without heating. It was indicated that, the larger the residential customer without heating, the better annual load factor. The heating customer's annual load factor ran around 27.9% on annual coincident demand whereas an average residential customer ran 32%.

What constitutes an adequate rate for street lighting and its effect on street lighting sales was also discussed before the Commercial and Industrial Bureau by Frank Woy, rate engineer, Montana Power Co. He analyzed the difference in the character of the load and the effect of the company owning the equipment on the over-all return and the factor of community development in setting a rate.

Commercial Cooking and Heating

Liveliest discussion period in the whole conference was had by the Commercial and Industrial Bureau under Blair E. Plowman, Washington Water Power Co., chairman, and O. J. Horrom, Montana Power Co., vice-chairman. Following each paper a spirited discussion session was had and many additional aspects of each problem were thus brought out.

J. Homer Shaw, Utah Power & Light Co., described his company's active promotional program on commercial electric cooking in natural gas areas. He showed a new booklet recently published playing up the many commercial cooking installations in the area.

K. E. Hollingsworth, Puget Sound Power & Light Co., questioned whether utilities should subsidize wiring to assist in commercial cooking sales. He did not feel it was necessary if the value of the commercial cooking itself was sufficiently well sold.

That electric space heating in commercial occupancies is good business was declared by W. A. Newman, Washington Water Power Co. He felt that it is as good a business as any type of load and saw no reason why companies should not push it. It fits with air conditioning as a balancer. Lighting now is used 12 months of the year in commercial places and therefore refrigeration and air conditioning offset heating. Utilities are finding that it is not peaking the system when they expected it to do so and the demand is not so high.

How the utility commercial man and the dealer in commercial cooking equipment can work together to sell more of this type of business was told by Albert Dugan, Dohrmann Hotel Supply Co., in a paper read for him by Clarence Scheyer.

A plea to develop more sales was made by L. Jerry Collins, Portland General Electric Co. With advent of natural gas, he said, it was more important that the utilities in Portland forget their competitive business and combine to see that the small commercial business was electric.

Chief complaint voiced in the discussion period was that so few dealers in commercial equipment have good service departments or know their merchandise well enough to sell it. How far the utility should go in selling it for them was brought up a number of times. Some said they would even sign up the business and process it through the dealer. Others thought with more promotion dealers would find more profit and help.

Lighting

That lighting does not cost, it pays, was maintained by Charles R. Long, Pacific Coast regional engineer, Westinghouse Lamp Division, San Francisco, in a talk similar to that given to the PCEA last year. Long introduced his talk with lively gimmicks, including baby chicks and a cash register. He showed a number of installations and told what the customer himself had said as to the improvement in business that followed a relighting job.

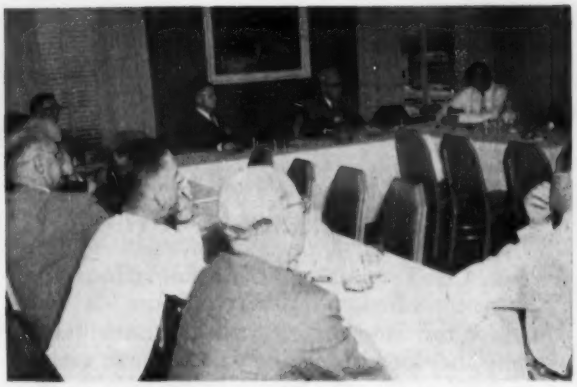
Charles L. Amick, illuminating engineer, G-E Lamp Division, Nela Park, gave a very effective demonstration of the value of group lamp replacement in commercial and industrial installations. He likewise described a number of techniques that could be used for maintenance. He showed that spot replacement labor alone costs about $1.40 per lamp, thus making it a most expensive way for replacement. He passed out charts by which to demonstrate the value of group replacement policies.

Earl S. Bossuyt, General Electric Co., Portland, described the 480-277 Y grounded interior wiring system advantages for commercial and industrial lighting in large buildings.

Servicing and Replacement

Whether or not a utility company should maintain an appliance servicing department for the public was discussed in a paper by Carl Hoffman, Washington Water Power. He told his own company's policy, which is to maintain such service and described the benefits to the consuming public. In the panel questioning on the same subject some sales managers felt that, where good servicing facilities were available among dealers, the company should not compete with them.

Rate committee considers the costs of serving electric heating



Around the table company farm electric programs were compared

Need to replace the obsolete electric ranges now in use in highly saturated company systems was discussed by J. F. Skelton, B. C. Electric Co. He described his company's old range trade-in program in which dealers were given $12 for each old electric range they turned over to a specified wrecking company. Thus these old ranges were destroyed and taken from the market.

Advertising and Publicity

Under R. K. Foley, Pacific Power & Light Co., as chairman, a round-table discussion was held by the advertising people on television as a medium for publicity, employee publications, furnishing of information to students on electric service company operations and a number of other similar subjects.

Officers Elected

With so many directors present, opportunity was taken to hold a meeting of the section's directorate to elect its officers for next year. Carrol Brissenden, Portland General Electric Co., who has been vice-chairman and who presided at several of the meetings, was elected chairman for next year. Kimball Jack, Washington Water Power Co., despite protest, was voted in as vice-chairman. Each bureau vice-chairman was elevated to chairman for next year and given the opportunity to select his own vice-chairman. The bureau chairmen will be: Electric Home, J. F. Skelton, B. C. Electric; Commercial and Industrial, O. J. Horrom, Montana Power; Rural and Farm, T. Karl Dimmitt, Puget Sound Power & Light. An additional vice-chairman for the Home Bureau was authorized, the person to be a home service director. Gordon Defoe was continued as chairman of the data sheet committee. It was decided to investigate the possibility of holding next year's meeting in Seattle or near there.

Total registered attendance was 171, the largest for a number of years. Idaho Power Co. was highly praised for the excellence of the arrangements made, not only for entertainment, but for meeting rooms and facilities. A special feature was "Hells Canyon Dungeon," provided by the distributors and manufacturers at the Elks Club. Henry Falkner was chairman of this committee.

Utah P&L Recharges Its Sales Battery

Sixty commercial, government and municipal and industrial consultants were put on the recharge line by Utah Power & Light Co.'s business development department manager, W. A. Huckins, May 17-21. It had been three years since the last similar sales training conference. From the reactions reported by the division commercial and industrial consultants, it will give them a charge of new ideas and prospects and add voltage to their efforts for months to come.

Assembled for the five all-day intensive sessions were some potent experts from the industry. The two Shaws, J. Homer, commercial director, and Wayne L., industrial director, who arranged the program, brought into their circuit the following: T. R. Harriman, manager, Dohrmann Hotel Supply Co., Salt Lake City; Rodney Ashby, director, and May Poulsen, consultant, Utah State School Lunch program; I. M. Farrell, sales manager, Restaurant & Store Equipment Co.; A. E. Fleming, manager, apparatus and supplies, General Electric Co.; G. B. Buck, district engineer, General Electric Lamp Div., Denver; Dale Brown, same company, Salt Lake City; Charles Long, lamp engineer, Westinghouse Electric Corp., San Francisco, and P. W. Smith, same company, Salt Lake City; E. E. Hulse, Westinghouse engineering supervisor, Salt Lake City; Wendell J. Ashton, Gillham Advertising agency; Slack W. Winburn, architect; Ted R. Brown, manager, Refrigeration Distributors Corp., Salt Lake City; Robert Thunen, commercial engineer, Sylvania Electric Products Co., San Francisco; W. A. Huckins Jr., manager, electrical department, Salt Lake Hardware Co.; L. B. Johnson, construction materials department, G-E; F. E. Young Jr., branch manager, Westinghouse Electric Supply Co.; Dr. ElRoy Nelsen, vice-president-economist, First Security Corp., Salt Lake City; R. R. Lang, application engineer, G-E Co., Salt Lake City; J. H. McKeever, industrial sales engineer, G-E. In addition discussion sessions were led by consultants from the various divisions, bringing out sales opportunities they had found.

Executives of Utah Power who also participated to give company policy, engineering data, power availability, etc., were: E. M. Naughton, vice-president and general manager; R. H. Ashworth, vice-president; J. E. Cushman, commercial manager; T. A. Purton, chief engineer; Olin Ririe, industrial relations manager; R. H. Jones, finance vice-president.

Among the company consultants who participated, leading question and experience trading sessions, were: Nephi Sachs, L. S. Evans, Alton Rose, Homer Sherwood, Dale Phillips, E. N. Christofferson, Harold Tripp, R. D. Nielsen, Wayne Mulcock, Don Peterson, Grant Lofgreen, Clyde Waterman, B. C. Martin, P. W. Smith, Allen Rudy, D. L. Holt, Evelyn Hansen, Darcie White, Richard Pizza, Clark Newell, Marden Millward, Walter Hendron.

Plant visits and a visit to the G-E Lamp Division Lightorama at the Coliseum were also included.

ELECTRICAL WEST

Way Is Cleared for A-W

IF LAST month's PCEA convention accomplished no other purpose, it was worth the time and effort because it showed how the door is opening to adequate wiring in 80% of the new homes being built in the U. S. "If we could only crack the mass building market" the a-w promoters have been saying for years and years. Now the way is cleared.

D. C. Slipher, building firm official and representative of the National Association of Home Builders, told why past efforts have failed. "I should put adequate wiring in, my customers will need it and should have it, but since my lending institution doesn't include it in the loan, my market will be restricted and the very customer I'm worrying about can't buy my home." To break the bottleneck, the NAHB has approved voluntary standards for service entrance and other wiring. These have been worked out in cooperation with the National Adequate Wiring Bureau.

To win acceptance for the new standards both the NAHB and the electrical industry have a selling job to do. The builders who account for 80% of the new homes and the lending agencies including the Federal Housing Administration and the Veterans Administration must be sold. This is a job for utilities to perform on the local level and industry organizations to do on a national scale. When appraisers and lending agencies approve, adequate wiring in new homes will be on its way.

Help for Higher Education

BECAUSE of its dependence upon engineering and scientific manpower, the electrical industry should be especially interested in two items on other pages of this issue. One is the highly significant treatise on the relationship between engineering education and technological progress by U.C.'s Dean of Engineering, M. P. O'Brien. The other is the McGraw-Hill Department of Economics' story on the grave financial plight of our colleges and universities.

Dean O'Brien shows how the engineer and scientist have contributed to America's dynamic economy and high standard of living. Then he compares our present performance in educating new engineers and scientists to what is happening in Russia. The result is foreboding. This country is falling behind, to a lesser degree for engineers to be sure, than for the technically trained men who must man the sub-engineering positions.

The McGraw-Hill editorial shows that unless business and industry rally to the support of the independent colleges and universities, they cannot continue to meet today's requirements for highly educated men and women, to say nothing of the stepped-up demands of the future. We must make these institutions "full partners in the economic well-being of the nation," it says.

Both of these discussions point up a hard, cold fact. Our industry has a huge stake in maintaining the highest possible level of scientific and technical education in this country. It ought to do something about it.

Don't Overlook the Sun

THE atom is not the only source of potential power to supplement the world's energy resources. One cannot overlook the sun. The newly announced solar-activated battery of the Bell Telephone Laboratories poses many questions and at the same time opens new avenues for research. The development is important because the potentialities of solar power are greatest in the semi-arid West and Southwest.

The Bell solar battery is composed of thin silicon strips, which generate electricity directly from the sun's rays, and it reportedly delivers 50 watts per square yard of surface. This is approximately 240 kw per acre. If more research can solve the problems of design and cost, one can picture desert-located power stations with hundreds of acres of the new solar cells. Or perhaps as an alternative each sunbathed home here in the West may have its own roof-top power plant.

Nor is this to be construed as idle spec-

EDITORIAL VIEWS

ulation. A group of Pacific Southwestern industrialists, bankers, agriculturists and power people have formed the Association for Applied Solar Energy. Already they are planning for a world-wide symposium on this subject to be held in Phoenix next January. Scientists from all over the world will contribute from a rapidly accumulating store of solar knowledge. Research and development during the last ten years are bringing forth some promising facts about the engineering and economic feasibility of solar energy applications. The range includes organic and inorganic photosynthesis, solar engines, solar space and water heating and the photovoltaic cell.

So we repeat, as a source of future power, don't overlook the sun.

Groucho Takes Over the Annual Report

HOW to make the annual report more attractive, interesting and readable has had everybody from the company treasurer and the advertising and publicity manager to the office boy popping up with ideas. And there have been some noteworthy contributions during the last couple of years.

Two of the recently issued 1953 utility reports have won special acclaim. One is the three-dimension report of the Arizona Public Service Company described last month in these pages. Another is the photographically magnificent and strikingly simple report of the Pacific Telephone and Telegraph Company.

Now along comes a public agency—the Sacramento Municipal Utility District—with an annual report that brings in humor in big bunches in the person of Groucho Marx. Groucho poses the questions in the typical candid, skeptical and stimulating manner in which he quizzes radio and television contestants. Witness a few excerpts:

Commenting on SMUD's $100,000,000 future development program: "That isn't alfalfa, to coin a phrase." Asking about 1953's contract troubles with the USBR: "Seems to me I heard quite a ruckus about the SMUD contract this past year. What did you fellas get into?" About promotion: "How is this selling job handled? By door-to-door salesmen handing out samples?" About the heat pump: "Blows hot, blows cold; sound kind of fickle to me. Is it expensive?" About personnel: "Are they all vice-presidents at SMUD or do some of them work?" About finances: "Enough of this encomium. Are you making any money?" Another gem: "Do you mind telling an old coupon clipper what you're doing to meet competition from the local gas company?"

Unquestionably Groucho will build readership for the SMUD report. What's next?

You Can Say That Again

A MISLEADING or false statement, often repeated, takes on a semblance of truth unless exposed or refuted. This is the nature of the statement often times made by public power proponents that the private utilities want to buy power generated by federal projects so they can make huge profits on it, and, consequently, they insist this power should be sold to others rather than private agencies. As this argument is constantly being used to justify the discrimination against customers of private utilities, the only way to refute it is by knowing and telling the facts. What is the truth? A fundamental of regulation of private utilities is that they can earn a fair return only on property owned by them and devoted to the service they render. Government power facilities are not owned by the private utilities and, consequently, they are prohibited by regulation from earning on such government property . . . Purchased power is an expense like purchased natural gas, taxes and wages and salaries. Government power projects are built with tax dollars collected from all tax-paying citizens. Then why should the purchase of federal power be restricted to a minority and denied the vast majority?—J. E. Loiseau, president, Public Service Company of Colorado.

NORTH—Shakopee, Minnesota praised the performance of its Form 206 luminaires. The new lights provide superior illumination even in sub-zero weather.

EAST—Central Maine Power Co. accomplished their working objective of providing better street lighting economically by installing Form 206 fluorescent lights at Auburn, Maine.

NEW G-E FLUORESCENT STREET LIGHTS GAIN NATIONWIDE ACCEPTANCE

Are fluorescent street lights practical? Utility and municipal officials who have installed G-E Form 206 fluorescent luminaires are best qualified to give the answer. Their actual field experience, in all parts of the country, is summarized in the following questions and answers.

WHY USE FLUORESCENT STREET LIGHTING?

Fluorescent street lighting provides better visibility and a more even light distribution than the best engineered systems of either filament or mercury lamps. The low brightness of the light source reduces the glare and eye strain that accompanies other types of street lighting.

IS VISIBILITY IMPROVED?

Yes. Many lighting experts believe that fluorescent street lighting increases actual visibility by about one-third. Thus, a 1.25 footcandle level from a Form 206 fluorescent luminaire seems to provide the same visibility as a 1.7 footcandle level from filament or mercury luminaires.

IS THE COLOR OF THE LIGHT PLEASANT?

Yes. The whiter light furnished by the fluorescent lamps does not distort the familiar coloring of objects and people. Businessmen find that shoppers even come from outside usual trading areas to shop under the comfortable light from the fluorescent luminaires.

IS THE SIZE OF THE LUMINAIRE A PROBLEM?

No. The Form 206 luminaire is only slightly over six feet long and the distinctive size and shape add functional beauty to the appearance of any street or roadway. No guys or trusses are required to support the luminaire even in high winds.

WHAT MAINTENANCE IS REQUIRED?

Maintenance is reduced! The fluorescent lamps used in the Form 206 have an average lamp life of 7500 hours, or about two years of street-lighting operation. The hinged plastic globe is shatterproof and is tightly sealed to prevent dirt or insects entering the unit. Sun, rain, heat, cold, or aging do not adversely affect the plastic globe or the light output.

HOW DO COSTS COMPARE?

When over-all lighting costs are computed on an equivalent visibility basis, G-E Form 206 fluorescent luminaires cost less than any other comparable system of filament or color-improved mercury. Although equipment and amortization costs are somewhat higher, installation costs are comparable, and operating costs are generally lower.

GET MORE INFORMATION about this outstanding G-E fluorescent luminaire, the Form 206. Contact your nearest G-E Apparatus Sales Office, or write Section 452-139, General Electric Company, Schenectady 5, N. Y.

SOUTH—Statesville, North Carolina installed 104 Form 206 fluorescent street lights and was enthusiastic about their visual comfort, economy, and modern appearance.

WEST—Virtually glareless illumination and an even light pattern resulted when Seattle installed Form 206 luminaires to light the second level of this new Alaskan Way viaduct.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Koch Coe

Patterson Lopp

Quinn Rust

RMEL Looks at Industry Problems

With more than 325 in attendance, Rocky Mountain Electrical League presented a well-rounded program of general and group sessions for its annual spring conference in Denver, May 2-4. Participating were the accounting, adequate wiring, engineering and information committees and the sales and promotion section.

In his opening address RMEL President M. M. Koch, Public Service Co. of Colorado, pointed to a 12.5% growth in electric output by utilities in the States of Wyoming, Colorado and New Mexico as compared with the national figure of 10.8% growth in 1953 over 1952. The same pattern is appearing in 1954, he said.

Utilities in the area installed 31,000 kw of generating capacity in 1953 and in 1954 have scheduled 221,750 kw. Of this 140,750 kw will be installed by USBR in connection with the Colorado-Big Thompson and the Alcova projects, he said. In 1955, 125,000 kw additional is planned. In 1953 utilities in the area, private and municipal, spent $23,143,000 on expansion and in 1954 have budgeted $23,939,000. The private utilities had electric revenues of $52,830,000 and paid $11,144,000, or 21.1c of every dollar, for taxes, he pointed out.

Continued progress in rural electrification was reported by Koch, who said that the three states had a combined coverage of 91.5% of the farms in 1953 as compared with 85.1% in 1952. Potentialities for continuing growth of load challenge the imagination, he stated. In the power field, the uranium mining industry in particular will continue to grow and many new industries are coming into the area, he said. With new appliances coming on the market, it seems very likely that the average home will prove to be inadequately wired to permit full use of electricity, he pointed out.

Koch's comments on the federal power policy and its effect in the Rocky Mountain area are on p 80.

Selling from the Heart

Two of the biggest problems facing modern business are reduction of overhead and improvement in worker efficiency, Byron Lopp, publicity director of the Central Bank & Trust Co., Denver, said in a talk at the general session. Human relations is the biggest unfinished job facing management, he believes. Pointing to the importance of getting employees to understand how business operates, he said they must be told about all the factors that enter into the cost of production. As in all selling, he remarked, the selling of this program must come from the heart.

Power from the Upper Colorado

While the upper Colorado River has been aptly named the last water hole for the basin states, it is not the last or only power source, declared L. R. Patterson, assistant vice-president of electric operations, Public Service of Colorado. The thermal power producing potential of the upper Colorado River Basin dwarfs the hydroelectric power potential of the upper Colorado River, he said.

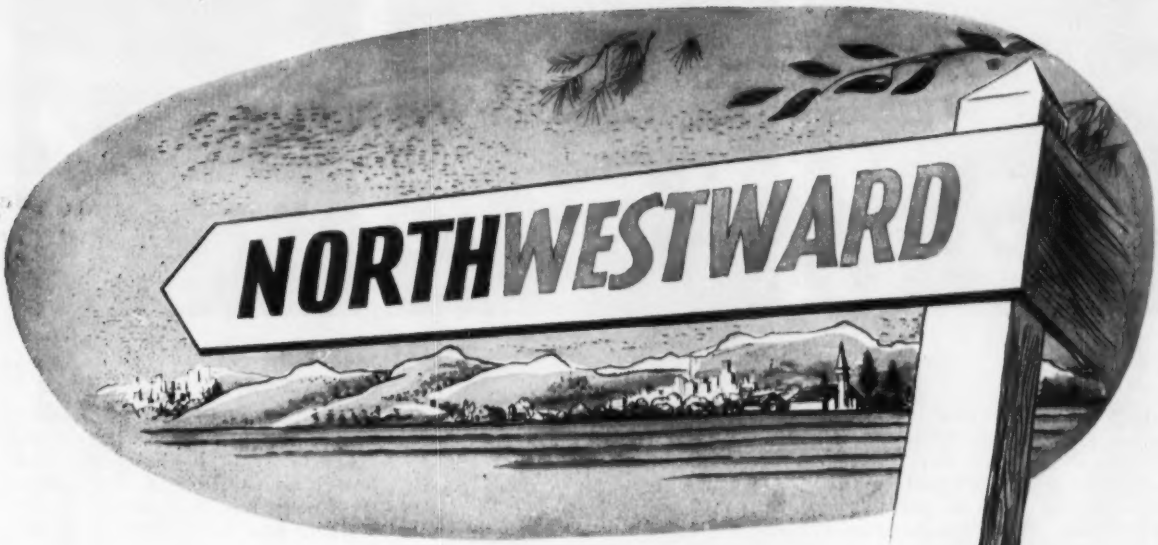
Ultimate development of the Colorado River Storage Project, as presently planned by the Bureau of Reclamation, will have installed capacity of about 1,600,000 kw, he said, pointing out that it is entirely reasonable to expect the full development to require at least 30 years.

Nine private companies in the area have offered to absorb the power from the project into their systems and transmit it to customers in the upper basin states. These companies operate 90 power plants with a total capacity of 1,250,000 kw, of which approximately 1,000,000 kw is steam. Since they are adding more than 150,000 kw of steam capacity a year, it is estimated that by 1960 their combined steam-generating capacity will be about 2,000,000 kw. They now have 6,150 miles of transmission lines, with some 1,900 miles additional planned by 1960.

Since Congressional committee hearings on the Colorado River Storage Project had not been completed, it was impossible to say what would be built where and at what time, Patterson pointed out. But the private companies making the proposal to transmit the power have some 580,000 kw of steam generating capacity under construction and scheduled for 1955, he said, and it is certain that they will continue to meet their responsibility to supply power requirements for present and potential customers.

Light's Diamond Jubilee

Light's Diamond Jubilee gives the industry the chance to tell the public of its 75 years of accomplishment in a sincere, warmhearted manner that is not boastful, Robert Coe, Union



. . . the Course of Empire Takes Its Way!" . . . Rapid, efficient development of the area's vast natural resources of electric power, fertile agricultural acres, mineral wealth, and timber has meant rapid increase in population, markets, and prosperity.

One of the vital factors in this progress toward a future unlimited in the Northwest is effective generation and distribution of dependable low cost electricity, and the promotion of its use for better living for all.

The Northwest Electric Light and Power Association is the medium through which leaders of the electrical industry—utilities, service companies, manufacturers, contractors, wholesalers, and dealers—have coordinated their efforts to make the area a world leader in generation and use of electricity.

In rendering service to the public the American private enterprise way, the Association and its members have stressed *service* and *enterprise*—for the greater good of both the public and the industry.

"Growth is the watchword in the Northwest, and business managed electric companies have been expending well over one hundred million dollars a year to serve their increasing customers, now numbering upward of 1,500,000. The application of the partnership idea for river development, with which these companies are fully cooperating, opens the way to even larger free enterprise power expansion and faster development."

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

OFFICES 204 CORBETT BUILDING • PORTLAND, OREGON

Goalby Watson

Casey Immer

Shott Gilg

Electric Co. of Missouri, St. Louis, pointed out in his luncheon talk. He said that the successes, hopes and accomplishments in the past, present and future may thus be told.

Celebration of the Jubilee is up to the individual company, with some supplementary national support, Coe stated. He suggested a company committee be appointed with top management represented and that local industry and civic leaders and the electric industry should participate in the final plan. The Jubilee offers an opportunity to recognize the services of all employees, he pointed out. "See it big and keep it simple," he urged.

Distribution

Features of a compression fitting should be incorporated into bolted fittings selected for distribution use, according to C. B. Sorflaten, Kaiser Aluminum & Chemical Sales, Chicago. These features are extremely high applied total pressures; curvature of wire bearing groove to conform to conductor shape; proper length of conductor groove; materials usually the same as the conductor.

E. A. Casey, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y., said that in overhead distribution 50 to 75% of the conductor requirements formerly met by copper will be met by aluminum. New interest is being shown in light-weight steel core designs for ACSR conductor, he pointed out. Anaconda believes that for service drops a two-layer combination (polyethylene or other thermoplastic insulation and neoprene or other rubber-like jacketing compound) is superior electrically to any single-layer construction of a neoprene insulation type of compound, he explained.

All cable manufacturers will soon be able to supply cables with butyl rubber insulation for 35-kv operation over a wide temperature range, according to W. L. Immer, General Electric Co., St. Louis. Silicone insulation is finding application in instances where size, weight and resistance to heat, even fire, are paramount considerations, he said, and volume production of silicone is reducing its price.

Steam Equipment

F. X. Gilg, Babcock & Wilcox, New York, told about the boiler being built by his company for a 120,000-kw turbine to operate at 4,500 psig and 1,150 F. He reported that this first universal pressure steam generator will use cyclone furnaces and will have two stages of reheat to 1,050 F and 1,000 F. Showing increasing popularity of reheat are the more than 80% of new large generating units ordered for this operation in 1953, he said.

Average size of new boilers for large stations is almost 1,000,000 lb/hr. Gilg reported that his company is building one 1,700,000-lb/hr unit to serve a 250,000-kw machine. The cyclone furnace and pulverized coal also are gaining favor for large and intermediate sizes of boilers, while the trend is toward spreader stokers in the smaller sizes. Boilers to burn more than one kind of fuel is another trend, he said.

Wood vs Steel

L. M. Robertson, Public Service of Colorado, pointed out that use of aerial ground wires and ground-fault neutralizers have markedly decreased trip-outs from lightning. These average numbers of trip-outs per 100 miles per year on 44-kv, 69-kv and 115-kv lines were cited: with no ground wire, wood, 12.8, steel, 21.1; with ground fault neutralizer, wood, 5.3, steel, 6.7; with one ground wire, wood, 7.0, steel, 6.5; with two ground wires, wood, 0.

13.2 vs 4-kv System

A 13.2-kv system eliminates three to five times the number of substations for the same load compared with a 4-kv system, according to Lee Jones, Colorado Central Power Co. In addition to lower cost, secondary rack construction should mean less time in the air for linemen as compared with crossarm and bus construction, he said.

Meter Book Readings

Use of meter book readings along with factors for diversity and load to estimate transformer kva demands was discussed by Roy Atkinson, Public Service of Colorado. He said the meter book method might reduce cost to about 40c per transformer. Field testing now costs about $8 per transformer, he pointed out.

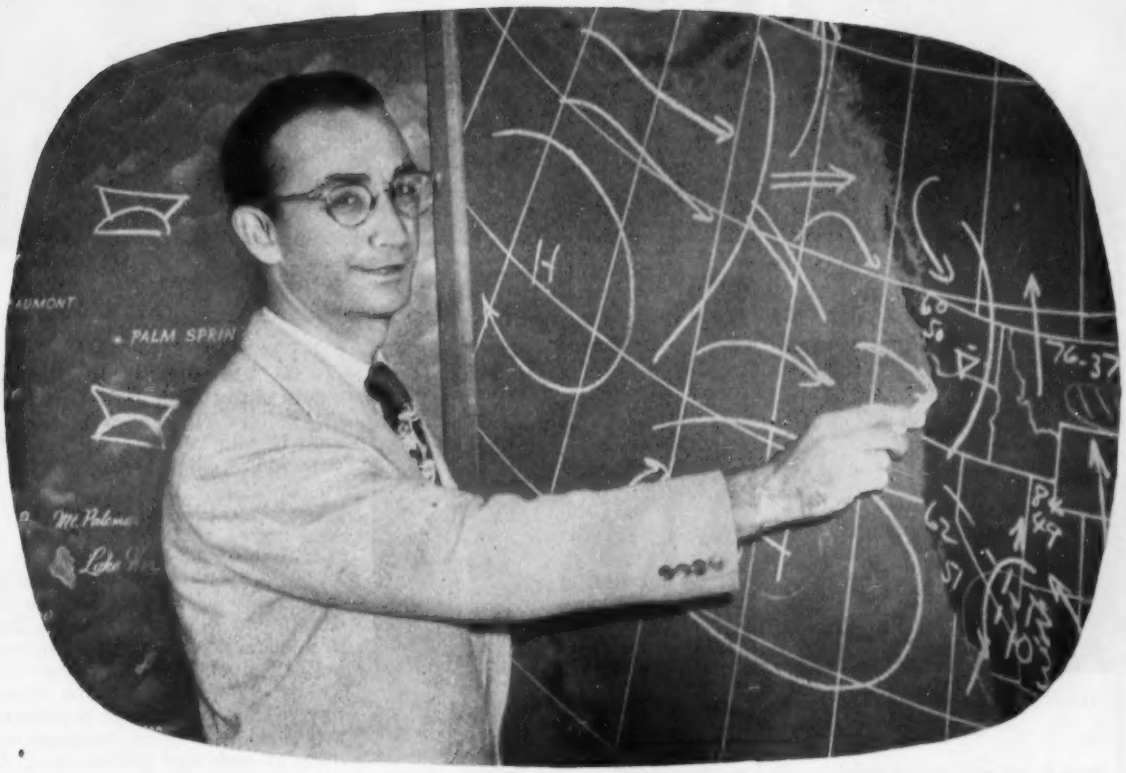
Monthly readings should be taken and plotted in making load checks on substation transformers and feeders, advised A. C. Kelm, Utah Power & Light. The load curve should be extended over many years to get a clear picture of the actual trend for use in system planning, he said. In choosing between conventional and CSP-type transformers, thought should be given to whether lightning protection really is necessary, he believes. If the need exists, cost of CSPs is favorable compared with conventional types plus lightning protection, he said. Cutouts should be used even with CSP type to give a convenient disconnect means, he suggested.

Selling Needed

How the electric league fits in with the dealer's own selling effort and how the latter can tie in with his association or league and make full use of its many aids and services was told by R. D. Halvorson, president of the Bureau of Home Appliances of San Diego County and himself a dealer in La Jolla, Calif.

While most estimates show that 1954 will be a good year, yet the customers must be sold, he said. To do this he suggested that manufacturers step up their advertising, supply prod-

EVERYBODY TALKS ABOUT THE WEATHER



-- BUT WE DO SOMETHING ABOUT IT TO HELP SELL MORE APPLIANCES!

This is Joe Marciano – San Diego's weather prophet – as he appears each week night over television to explain tomorrow's weather to San Diegans.

Called "The Weather Word," it is sponsored by the San Diego Gas & Electric Company – and it enjoys one of the highest ratings of any television show in the San Diego market.

Besides its obvious worthiness as a public service, The Weather Word has been used in recent months to sell proper lighting, adequate wiring, home freezers, refrigerators, water heaters, air conditioning, appliance shows and dehumidifiers.

We say sell, because one announcement used one time on it brought in over 500 telephone calls for more than 750 booklets on proper television lighting.

Yes – in San Diego, we have a weather-eye on sales – and we're using The Weather Word to sell better living through electricity to everyone.

SAN DIEGO GAS & ELECTRIC COMPANY

Webb Kelm

Jones Robertson

Bernzen Neely

Hyer Kerr

Halvorson Person

uct knowledge and selling helps.

The dealer must use such aids properly. He must train salesmen. To do so Halvorson told how the San Diego Bureau's sales training program operates. He also described its promotional campaigns, conferences and shows to which all the dealers and distributors in the area tied in and made the most of a stimulated activated market.

Adequate Wiring

Pointing out that there has been progress in adequate wiring, H. H. Watson, General Electric, Bridgeport, said that contractors and dealers now are promoting it. Soon banks may encourage the lending of money for modernization and rewiring and establishment of General Electric Credit Corp. to lend money for rewiring will be reported in the near future, he stated.

Utilities with larger capacity reserves can be expected to increase their budgets for adequate wiring promotion, he believes. NEMA will study all phases of the problem of the proper secondary voltage of the future, he reported, and a joint REA-EEI-NEMA committee will look at ways to build load on the farm.

An approved draft of the revised adequate wiring handbook is expected to be ready in November, Watson said. He discussed the changes in requirements for lighting and appliance outlets, noting that one 15-amp outlet will be required for each 375 sq ft of area and one 20-amp unit for 500 sq ft. The new kitchen appliance circuit should be a three-wire circuit with provisions for split receptacles to take 230-v appliances. New range circuit should have 50-amp capacity, clothes dryer, 30 amp, air conditioning, two-wire, 230 v, he stated.

In 1953, 50,000 air conditioning units were returned because of inadequate wiring in the home, according to Guy Thomas, Public Service of Colorado. When wiring is needed to install an appliance, that is the time to sell an entire adequate wiring job, he advised. A flexible plan to finance wiring will be a definite step toward selling more adequate wiring jobs, he pointed out. Thomas was hopeful that the air conditioning industry would follow up on the program and develop a plan to put adequate wiring across.

Karl Krummel, Collier Electric Co., Denver, remarked that, although the cost of installing the plumbing has increased tremendously as compared with the cost of wiring, plumbing still is promoted while adequate wiring is played down.

Ira M. Beck, Central Electric Supply Co., Denver, suggested that adequate wiring be promoted first with the builder. The rewiring program must be sold to owners of homes five years old or older, he said.

Teacher Education

It is the direct responsibility of business to see that the economic factors concerning industry and the free enterprise system are made available to public school teachers, in the opinion of Robert T. Person, Public Service of Colorado. He said that community relations for a large organization are dependent upon employee conduct, attitude and performance. Any public relations program must start with the employees. This program need not be elaborate but must meet the primary needs and desires of the employees in each organization, he suggested.

Committee

Robert T. Person was general chairman for the conference. Committee and section chairmen were: Kenneth J. Haines, general sessions; E. E. Matthews, accounting; J. L. Vanneman, adequate wiring; Ken Eaton, engineering; J. B. Howe, entertainment; Warren Terry, information; Kenneth J. Haines, publicity; W. L. Duncan, sales and promotion; W. G. Gestland, sociability. Greeters were H. T. Rankin, chairman, J. W. Alexander, J. A. Bullock, J. W. Cryder, J. B. French, W. D. Johnston and the officers.

Reports on the recent NWEL &PA accounting section and the NWPPA engineering and operating section meetings will be carried in the July issue.

Here's Something
TO BE PROUD OF!

The vitality of an Association can be measured by the extent to which its individual members participate in its affairs. We're proud of this attendance record at major PCEA meetings during the past year. Look it over:

Annual Convention—Coronado	870	members
Engineering and Operating Section—San Francisco	760	"
Hawaiian Section—Honolulu	300	"
Business Development Section (10 regional meetings)	2000	"
Administrative Services Section—Berkeley	150	"
Los Angeles	150	"
Grand total—major meetings	4230	"

Add to this the hundreds who attended the many committee meetings throughout the year—Guidance, Air-Conditioning, Underground, Board of Directors, etc., etc.—and you get a truly impressive measure of the thing that makes PCEA one of the most vital forces in Western electrical development—*individual member participation.*

If you are not already a member, you will get real value from participating in PCEA programs and activities. Call, or write, either of the offices for full details.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 W. SIXTH STREET, LOS ANGELES 14, CALIFORNIA, TUcker 5610

681 MARKET STREET, SAN FRANCISCO 5, CALIFORNIA, DOuglas 2-1556

THE MONTH IN BRIEF

Five Companies Sign with AEC

Five private utilities of the Pacific Northwest have entered into an agreement with the Atomic Energy Commission under which they will pool their technical resources to study the feasibility of a nuclear reactor as a source of electric power. They are the same five companies who recently formed the Pacific Northwest Power Co. for the purpose of joint construction of large hydro plants—Montana Power, Mountain States Power, Pacific Power & Light, Portland General Electric and Washington Water Power. The action followed the AEC's invitation to private industries to investigate possibilities of using their risk capital to develop and build a nuclear power plant.

Offers to Buy CVP Facilities

If Congress desires, Pacific Gas and Electric Co. is willing to buy the power transmission facilities and power plants of the Central Valley Project and to establish a working partnership with the federal government. The offer was made in a statement before a Hoover Commission task force in San Francisco early last month. (See p 140.)

Electric, Not Political Kw

"We want production of electric kilowatts and not political conversation kilowatts," Interior Secretary Douglas McKay reiterated in the Northwest last month. Returning to his home state before the Oregon primaries last month, he defended the administration's partnership plan for hydro development and reassured Bonneville employees that the Republican party is not out to emasculate the federal agency. Speaking on TV, he stated that he was determined to keep federal power rates as low as possible, consistent with good business principles; that there would be no increase in BPA rates for at least two years and he thought the new rate would be something less than a base of $22.50.

Partnership Advocates Win

Two proponents of the partnership power policy were successful in Oregon's primary election against opponents who tried to make power policy a major issue. In the gubernatorial race, Gov. Paul L. Patterson defeated Secretary of State Earl T. Newbry for the Republican nomination by more than three to one. Newbry had come out for full federal development of the Columbia. First-time candidate Thomas Lawson McCall, former McKay administrative assistant, won the GOP nomination for the Portland-Multnomah congressional district against veteran Homer D. Angell, who had worked for partnership projects such as Cougar Dam but at the last minute of the campaign came out strongly for a high federal dam at Hells Canyon.

Condemnation Going to Jury

Value of Washington Water Power properties in Chelan County will be considered by jury in Chelan superior court, beginning Sept. 20. Although the trial was postponed, the court ruled against an injunction brought by the company, which claims that the situation has changed since the original certificate of necessity was granted in 1948. The PUD now has six generators at Rock Island Dam, it was pointed out.

Hearings Resumed

FPC hearings in Washington, D. C., on Idaho Power Company's application for permit to build its Hells Canyon project were resumed last month, following a two-month recess. Earlier Idaho Power President T. E. Roach charged that intervenors were purposely delaying FPC processes; that a deliberately created misconception was giving the impression that there are two applications before the commission, one for the company's three dam proposal and one for the federal high dam. Actually, Roach said, there is only one—that of Idaho Power.

Benefits Will Be Studied

British Columbia will demand a share of power from Libby Dam in Montana and other Columbia hydro projects planned in the United States, according to Lands and Forest Minister Robert Sommers. The announcement was made following a meeting with the Columbia River Basin Development Advisory Committee to iron out problems surrounding payments for upstream and downstream benefits from power dams in British Columbia and the United States. Results of the study on Libby by an engineering subcommittee will set the pattern for other projects and may be applied to Ross Dam, Sommers said.

Klamath Commission Appointed

California's Gov. Goodwin J. Knight last month appointed a Klamath River Commission to cooperate with a similar organization in Oregon in an attempt to solve water problems on the Klamath watershed affecting the two states. The California group, which will have $25,000 to spend, was authorized by the legislature last year. The Oregon commission has been active since August 1953 and has submitted recommendations to Interior that the California Oregon Power Co. be permitted to raise its dam at the outlet of the upper Klamath Lake.

Pine Flat Dedicated

Pine Flat Dam, a $40,000,000 multipurpose project on the Kings River east of Fresno, Calif., was dedicated May 22, with Major General Samuel D. Sturgis Jr., chief of the Corps of Engineers, making the principal address. The dam was started seven years ago; has three penstocks for a future power plant.

Bond Proposal Defeated

Union County PUD's proposal to sell $4,500,000 in bonds to buy California Pacific Utilities Co. properties in its area was defeated in the Oregon primary election by a vote of 2,600 to 2,209. The properties are under condemnation by the district but a jury last December set valuation at $3,580,405. The PUD had authority for only $925,000 in revenue bonds.

BULLDOG ALUMINUM BUStribution® DUCT helps North American build Super-Sabres

1600-amp. LO-X BUStribution serves as main feeder to welding department to minimize voltage drop during welds.

600-amp. Plug-In BUStribution, with tap-off provisions each 10", provides 100% coverage of production area with 50-foot runs.

North American F-100 Super-Sabre

To keep their famous Super-Sabre Jets rolling smoothly off the line, North American Aircraft needed a dependable, flexible power distribution system. That's why, in two installations alone, they installed more than half-a-mile of BullDog Aluminum BUStribution Duct.

The high bay construction, and the obstacles presented by girders and pipes in the North American plant, were a natural for the use of lightweight aluminum bus duct. The weight saving in each 10′ duct section greatly eased the strain of the extra handling required in the installation job. Less dead weight on building superstructures, too.

These savings in installation costs — in addition to lower first cost — are prime reasons for the widespread use of BullDog Aluminum Conductors in plants throughout the country.

Aluminum BUStribution Duct features in its design the same quality and dependability that have gained BullDog world-wide reputation as a pioneer of bus bar distribution systems. It is completely interchangeable with other BullDog BUStribution systems and is listed by Underwriters' Laboratories, Inc. For complete information, consult your local BullDog Field Engineer. Or, write: BullDog Electric Products Company, Dept. EW-64, Detroit 32, Michigan. ©BEPCO

Export Division:
13 E. 40th Street
New York 16, New York

In Canada:
Dominion BullDog Limited
80 Clayson Road, Toronto 15, Ontario

BULLDOG
ELECTRIC PRODUCTS COMPANY

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

Coast Electric & Manufacturing Company
1733 N. E. Seventh Ave.—Tel. TUxedo 5191
Portland 12, Oregon

Safety Switchboard Company
910-89th Ave.—Tel. LOckhaven 9-7001
Oakland 21, California

BullDog Electric Products of Los Angeles
2885 E. Washington Blvd.—Tel. ANgelus 9-8101
Los Angeles 23, California

Young Electric & Manufacturing Company
2134 Curtis Street—Tel. AComa 4841
Denver 2, Colorado

This superintendent found out how good

ROME•RIGID steel conduit really is

The superintendent of a large west coast electrical contracting firm found that he could not flake off the galvanizing on ROME • RIGID conduit.

He was bending 1" conduit by hand, but the radius he wanted did not quite come off. So he bent the conduit back and forth *four times* before he was satisfied.

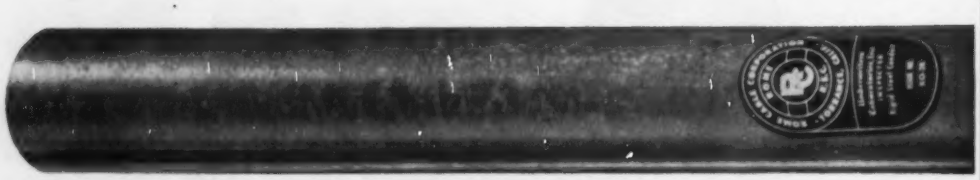
Then he grinned and said, "This is the first time in my experience that I have bent conduit this way without getting distortion or flaking-off of the galvanizing."

Well, Mr. Superintendent (and you, too,) there are some very sound reasons for this. The quality of ROME • RIGID is no accident. Take a quick look at the pains Rome Cable takes to make it a conduit you can install fast, easily, and at low cost . . . a conduit that will provide safe, corrosion-free protection for many years to come.

Mail the coupon to get the complete "Story of ROME • RIGID."

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

ROME • RIGID is made in 10-ft. lengths with a coupling attached in diameters from ½" to 6". Extra couplings and elbows for this complete size range are available. Fully approved by Underwriters Laboratories, Inc., ROME • RIGID meets all requirements for safe steel raceway.



1 The Sendzimir hot-dip galvanizing process *requires* high quality hot-rolled sheet steel, free of heavy mill scale and pits found in "skelp" used in ordinary rigid conduit. We check thickness, hardness and surface quality constantly.

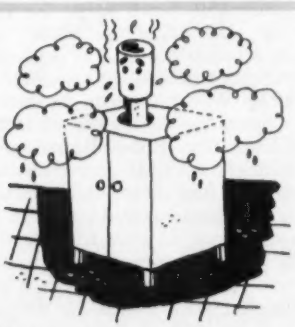
2 To further improve surface quality, we first run the full width of sheet stock through a shot blast. This completely removes all oxides, rust, roughness or dirt, leaving a uniformly clean surface. We then slit the stock to proper widths for the forming rolls which shape it into round pipe.

3 Cold forming maintains the uniform thickness of the steel. As the pipe is formed, electrical resistance welding such as is used in making high pressure boiler tubing, closes the seam with a superior joint.

4 Next, we remove any weld flash inside or out with a scarfing tool and inspect each length for straightness. Any that fail to meet this test, we put on the straightening machine.

5 Now for the "hot dip." Rome finds the use of Armco Steel Corporation's patented Sendzimir galvanizing process feasible only because the sheet steel Rome uses for RIGID conduit provides the kind of surface this high quality process requires for successful application.

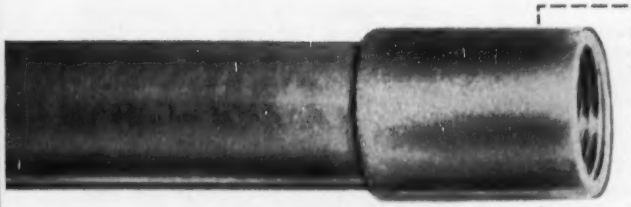
6 First step in the Sendzimir process involves preheating each length in a furnace which, under a carefully controlled atmosphere, burns off any dirt, oil or scale, inside and outside. This treatment produces a blue oxide which makes the inside pipe look like a gun barrel.



7 Next the pipe goes to a reducing furnace which performs two important functions. First, it anneals the pipe, providing a soft, ductile conduit which can be accurately bent. Then, it reduces the blue oxide to a mirror-smooth, stain-free surface.

8 Pipe is then discharged into a molten bath without being exposed to a temperature variation and oxidation. It requires no pickling or fluxing. The pipe is conveyed through a zinc bath, at controlled temperature and time which guarantee a uniformity never before attained in galvanizing rigid conduit.

9 ROME • RIGID is then lacquered inside and out and baked to smooth, hard coating to provide a slick, low-friction surface for easy pulling. 100% of the product then receives inspection, inside and out. Color-coded thread protectors and Underwriters label are applied, and the pipe is bundled for shipment.



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A new type of glass lathe is said to handle specialized glass work in labs and some production operations. It can be used to make ring seals, flanges, closures, glass fusings. A novel sleeve grip chuck allows quick set-ups of practically all forms of glass work without elaborate accessories.

How to quench a city's thirst. Faced with the future problem of serving 100,000 people, the City of Vallejo, California, engaged Kaiser Engineers to design and direct construction of a water system that would supply 21,000,000 gallons per day to the city. This

$6,000,000 project included 36 miles of pipeline, pumping and treatment plants, reservoirs and a distribution system. Reprints of this story are available upon request.

Relaxation Methods by D. N. de G. Allen, recently published by McGraw-Hill, explains how to use the Relaxation Method to solve various mathematical problems which arise in engineering science and applied physics. It covers in detail such recent advances as three-dimensional relaxation.

Kaiser Engineers has a large staff of engineering and construction experts ready to tackle your problems in all fields of design, engineering and construction. Call or write: Kaiser Engineers, Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

THIS MONTH'S NEWS

Utilities Testify at Task Force Hearings

An offer to buy Central Valley Project power plants and transmission facilities if Congress desires was made by Pacific Gas and Electric Co. before the first hearing of the Hoover Commission task force on water resources and power, held in San Francisco in May.

The proposal was made by Robert H. Gerdes, vice-president and general counsel, who said such an operation would increase CVP revenues, reduce cost of the water, save federal tax funds, create new tax revenue for both federal and local governments.

Any benefits from purchase of government power would be passed on to all customers instead of the few given preference under the Reclamation Act, he pointed out.

Congress last year directed Interior to study PG and E's offer to take over transmission facilities of the Folsom project. The company now will go further and is willing to buy all existing transmission lines, switchyards and substations of CVP at their present value and to market all project power throughout its area under state-regulated rates.

PG and E is ready to pay cash, Gerdes said. The transfer would save the government more than $3,000,000 a year, create about $800,000 annually in new federal taxes and more than $600,000 a year in state and local taxes. The company would continue to pay the price set by the government for CVP power and power for project pumping would be provided by the company on an exchange basis.

During the period from 1944 through 1951, PG and E bought substantially all project power, Gerdes told the committee. CVP revenues from water and power sales during this period totaled $48,000,000, of which more than 90% was paid by PG and E.

Despite this, he said, until two years ago the bureau persistently requested Congress for funds for an independent system. Such a system, terminating at Tracy, was built at a cost of $35,000,000. This reduced the project's net revenue by $2,000,000 a year in comparison with revenues from power sold to the company near project dams, he pointed out.

Another witness, Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of Water & Power, made a plea for accurate accounting methods and full disclosure of hidden subsidies in federal multiple-purpose water and power projects. He urged that the long-term interest cost of money to the government be included in determining annual costs of all projects.

Morris recommended: (1) elimination of the "one basin" account for river systems, by which economically unsound projects could be pooled with economically feasible projects; (2) repayment by those who benefit directly from federal multipurpose projects of their proper share of the costs of functions that benefit them; (3) a maximum 50-year repayment period on all projects; (4) consideration of revenue bonds as a means of financing new federal projects.

State acquisition of CVP had a proponent in William M. Harrison, chairman of a 36-man committee campaigning for transfer of the project. The committee's program includes: (1) state ownership; (2) The U. S. government must be repaid reimbursable funds spent for construction; (3) financing should be based on revenue bonds; (4) legislation for purchase should be expedited by the State Water Project Authority.

Speaking for Southern California Edison Co., Bruce Renwick, general counsel, said his company is ready, willing and able to undertake the development of hydroelectric projects and resources within its service areas as they become practicable and economically feasible. There is no need for the government to develop any such projects in these areas, he said.

The task force also held hearings in the West at Denver and Portland.

Utility Rate Increase Studied by Commission

California Public Utilities Commission last month heard final arguments on Southern California Edison Co.'s application for a general rate increase, an application filed Dec. 16, 1952.

Hearings on the request have been held in Los Angeles and in the San Joaquin Valley since last June. Edison, which has not had a general rate hike in over 31 years, says the proposed increase would cost the average domestic customer about 25c per month, would add some $16,000,000 to company's annual gross revenue.

Through heart of downtown San Francisco . . .

P. G. and E. Buries New 12-KV Tie-Line 15 Feet Under Sacramento Street

To provide additional power supply for Station "J," located at Sacramento and Liedesdorf Streets, near the center of San Francisco's financial district, the Pacific Gas and Electric Co. is installing a new 12-kv tie-line bewteen "J" and the big Mission Sub-Station at 8th and Mission streets. A new 8-way encased duct system has been constructed, using 5" Soapstone OCT-O-DUCT laid in tiers 2-wide and 4-high. Two 750 MCM gas-filled cables will be pulled in for this new circuit.

Feature of the duct system is the run from Stockton Street down Sacramento to Liedesdorf which was laid in trenches 15 feet below the street surface! Open trench about 3 feet wide was used for most of the run, but night-crews tunneled under busy intersections at Kearny and at Montgomery Streets to eliminate traffic interference.

The unusual depth was required for this stretch of duct in order to avoid the many other underground services present in the area. It is one of the deepest underground runs ever constructed under San Francisco streets. P. G. and E. has used many thousands of feet of Soapstone conduit in its San Francisco underground system. The Mission -"J" tie-line is the first long run of new OCT-O-DUCT laid by this utility.

New Soapstone OCT-O-DUCT has been designed for easy, fast handling in the field. Its low first cost is only the beginning of the economies that Western electric and telephone utilities have been able to effect by using it. OCT-O-DUCT is just the right length for fast erection, even in the deepest and narrowest trenches. Simple collar-type couplings need no field tooling. The electrical, chemical and strength characteristics of this smooth conduit exceed utility and Government specifications.

New Bulletin 54-A tells all about Soapstone OCT-O-DUCT. Also available is a manual of field practices, "How to Install Soapstone OCT-O-DUCT." Write for your copy of either or both of these publications.

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New Management of Nevada Company Announces Four-Year Expansion Program in Las Vegas Area

Southern Nevada Power Co. is embarking on an $11,000,000 four-year expansion and rehabilitation program to meet the phenomenal load growth in the Las Vegas area, according to Reid Gardner, newly elected president of the utility. The program includes construction of a 44,000-kw steam plant to be in service by December 1955.

Gardner, who formerly was president of Arizona Edison Co., is one of a group that includes the William R. Staats Co. and the First California Co. which recently purchased the holdings of Sam Lawson, former Southern Nevada Power Co. president. In June the group will take over another large block of stock from other interests. Cyril Wengert, vice-president and secretary, one of the original owners, will remain with the company.

Dunlap D. Smalley, former vice-president and assistant general manager of Pacific Gas and Electric Co., will take over as vice-president and operating manager.

The Southern Nevada system which had a peak load of only 800 kw in 1936 carried a 100,000-kw peak in 1953. For the first four months of 1954 kwh sales were 25.5% ahead of the same period last year. It is this growth that necessitates the expansion program. The utility has a firm contract for 263,000,000 kwh annually from Hoover Dam and has been buying enough energy to meet its annual requirement of 330,000,000 kwh from other Colorado River power contractors. This additional power will not be available beyond next year.

The new 44,000-kw steam plant will be located between Las Vegas and Hoover Dam on a site not yet selected. Provision is being made for an additional 66,000-kw unit to be installed at a later date.

Rehabilitation plans include revamping the distribution system and converting the present 33- and 69-kv transmission system into a 69-kv loop.

One of the factors contributing to both load growth and high usage on the Southern Nevada system is the low domestic rate. The bottom block in the residential schedule is 5 mills, the lowest in the nation.

Considerable new financing will be involved, according to Gardner. The company is negotiating with three insurance companies for the sale of $4,400,000 of bonds. At a later date $1,000,000 of debentures will be put on the market. Sometime in June 50,000 shares of common will be offered to the public at approximately $11.50. Another $500,000 of common will be put on the market in 1955.

SMUD Asks Permit for Power Development

Sacramento Municipal Utility District has applied to the Federal Power Commission for a preliminary permit for a proposed $16,000,000 White Rock power development on the South Fork of the American River north of Placerville, Calif.

The proposed development is part of the district's $80,000,000 American River project, for which water right applications are now pending before the state engineer. The original application to FPC did not include the White Rock power plant, one of four proposed by SMUD.

The White Rock development would consist of an arch concrete dam 130 ft high, backing water 4 miles to the proposed Camino power plant, according to James E. McCaffrey, general manager and chief engineer. A 9-mile tunnel would be required to carry the water to a plant where the water would be returned to the American River through a 46,000-kw power plant.

Engineers' estimates show SMUD's present power supplies could be exhausted in five or six years and it will take some three or four years to construct the hydroelectric development. SMUD Board President Royal Miller said his staff is examining the possibility of construction of a steam plant that could serve the district's needs during an interim period and eventually be used to firm up the power that could be developed by the American River hydro plants.

• **FPC** has issued a one-year preliminary permit to Montana Power Co. for a proposed hydro project on the Flathead River in Lake County, Mont. The development would include a concrete dam at Buffalo Rapids, about four miles down stream from an existing plant near Polson; a reservoir and power house with initial capacity of 80,000 hp.

• **Montana Power Co.**'s board of directors has authorized issuance of $12,000,000 of new securities and refunding of $18,000,000 in debentures. The board approved sale of $12,000,000 in first mortgage bonds and new preferred stock, proceeds of which will be used in the company's 1954 construction program.

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NEW
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DESIGN LEADERSHIP FEATURES

Distinctive Styling provides an attractive, modern appearance matching the control center design.

Easier Installation because removable front and back plates expose generous wiring parts. Isolated horizontal wiring trough has drop-off openings, assuring safer, neater wiring.

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Write for Bulletin SD-18. Address Square D Company

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Space economy, too. Up to six combination starters fit in a 20"x20"x 90" section. Plug-in unit heights are designed in space-saving increments of 3 inches.

Write for Bulletin 244. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

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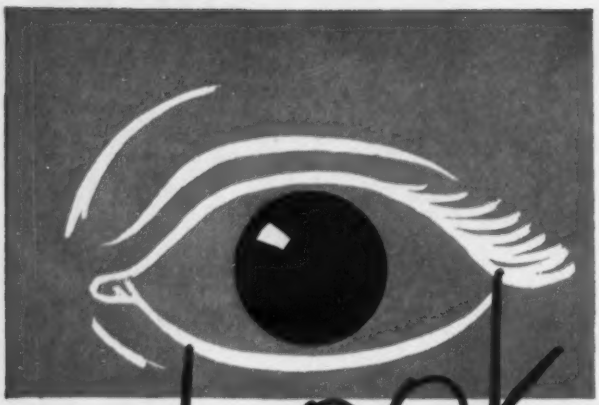
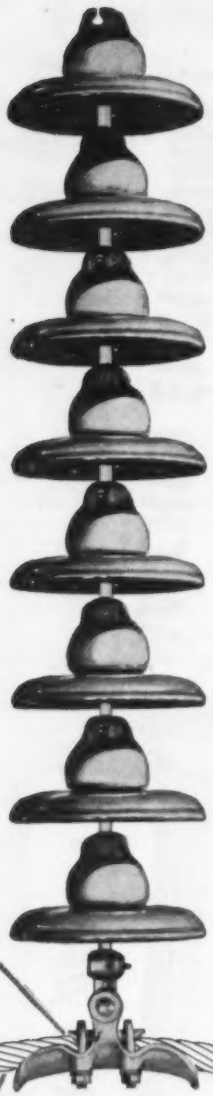


LOOK . . .



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• Maintain indefinitely their initial uniform, tight-fitting contact over the entire length of armor . . . assure uniform radial pressure throughout.

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• Do away with nuts, bolts and clamps, thereby eliminating any possibility of initial damage to conductor or subsequent loosening.

• Reduce operating temperature by providing a larger current path through the support.

*Preformed Armor Rods are manufactured under Patent No's 2,275,019 and 2,587,521 . . . other patents pending.

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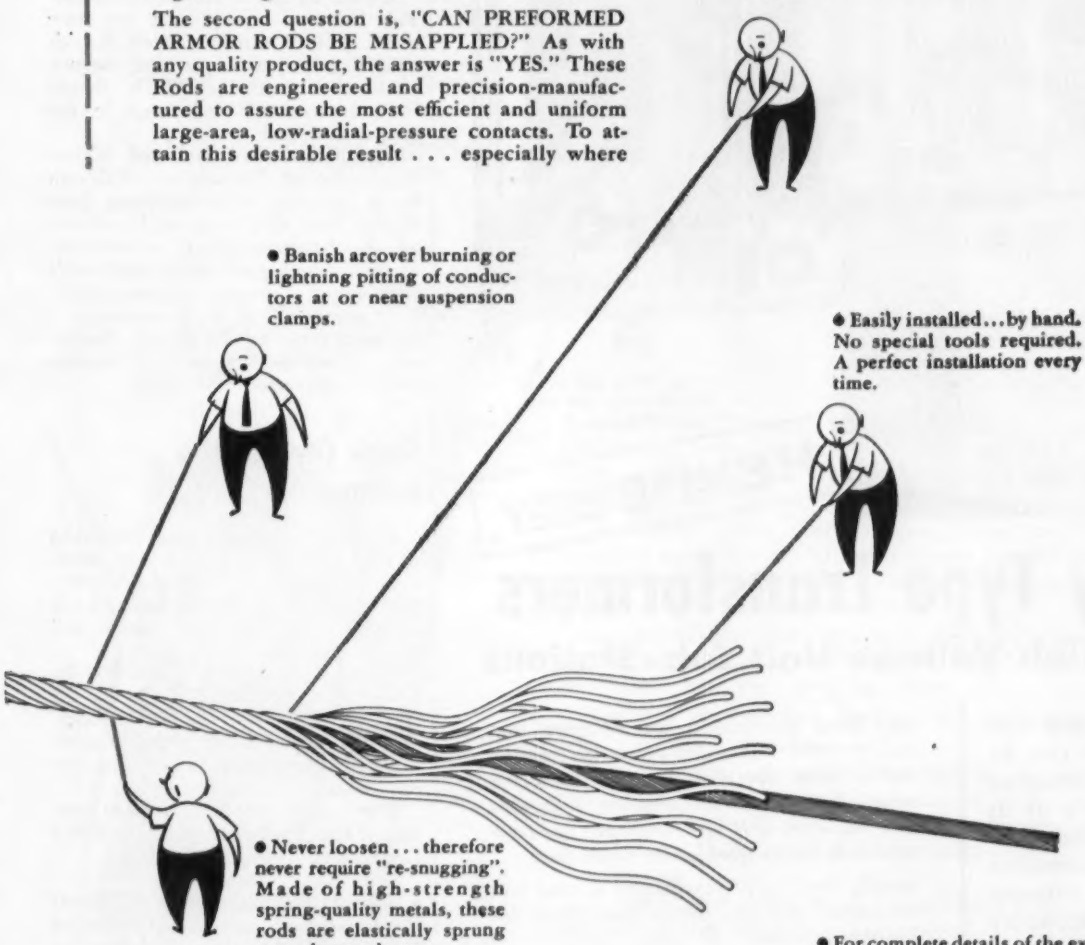
TWO QUESTIONS

Occasionally, we are asked two questions. The first one is, "SHOULD PREFORMED ARMOR RODS BE USED AS DAMPERS?" The answer is "NO." The damping capacity of Armor Rods is slight as compared with properly engineered vibration dampers. Where damping is required, use dampers of the right size, located at the optimum points on the conductor and tuned to the vibration frequency of the conductor.

ARMOR RODS are for reinforcing the conductor and protecting it from damage caused by vibration, concentrated clamp stresses, chafing, arcover, etc. The damping effect of all Armor Rods is negligible. They reduce loading and bending stresses, thereby tremendously increasing the fatigue life of the conductor.

The second question is, "CAN PREFORMED ARMOR RODS BE MISAPPLIED?" As with any quality product, the answer is "YES." These Rods are engineered and precision-manufactured to assure the most efficient and uniform large-area, low-radial-pressure contacts. To attain this desirable result . . . especially where tensions are high, temperatures low and vibration severe . . . each set of Preformed Armor Rods must be applied to the conductor for which it is designed and the rods must not be distorted during application. If rods are reused, make sure they are removed and reapplied with care and that their dimensions are checked closely.

Applied correctly, Preformed Armor Rods assure the longest satisfactory transmission and distribution line life.



• Prevent wear, chafing or fretting and will not cause radio or television interference.

• Banish arcover burning or lightning pitting of conductors at or near suspension clamps.

• Easily installed...by hand. No special tools required. A perfect installation every time.

• Never loosen . . . therefore never require "re-snugging". Made of high-strength spring-quality metals, these rods are elastically sprung onto the conductor.

• For complete details of the exclusive advantages of Preformed Armor Rods, write or telephone Cleveland: EXpress 1-3571.

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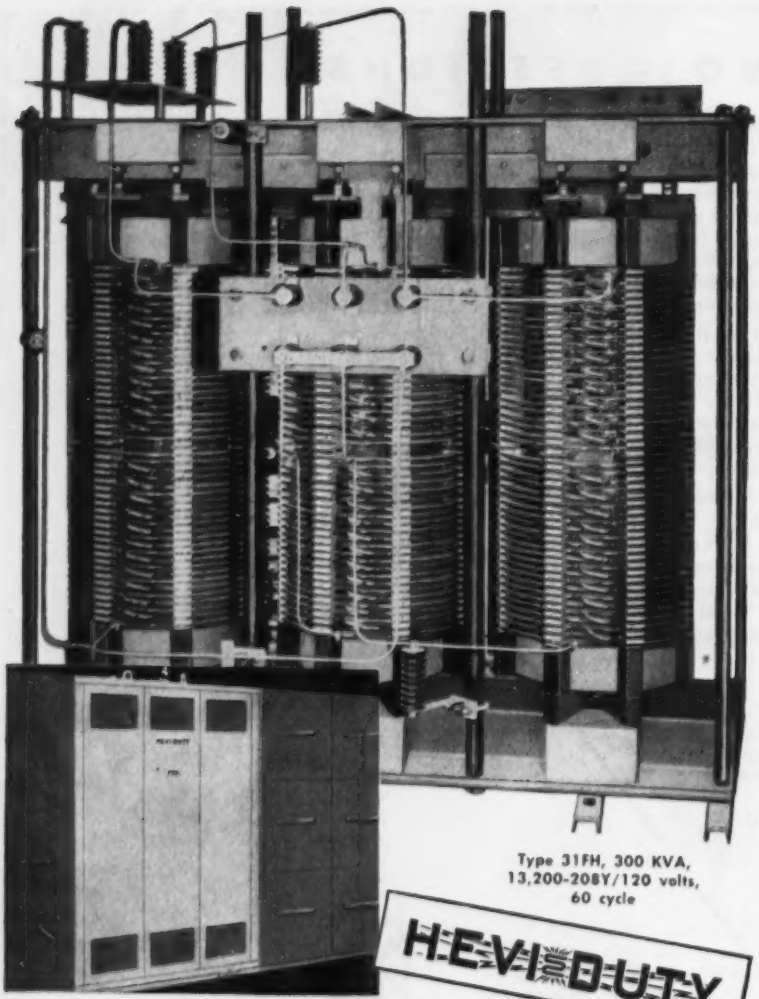

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Hevi Duty Transformers are designed and built to offer that extra protection needed during peak operating periods. Note the adequate core and coil blocking, high voltage insulators and well ventilated pancake type coils on the transformer shown here.

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POWER NEEDS TOLD IN REPORT TO COMMISSION

The State of Washington needs 400,000 more kilowatts of electric power "merely to maintain" present loads in low water periods, its power commission has been told by Managing Director J. Frank Ward.

Ward's report was made at a May 14 meeting, when Tom Quast, PUD member of the commission, urged reconsideration of the group's earlier action in deferring consideration of a joint operating agency requested by a group of PUDs and municipalities. (EWEST, April, p 124.) Other members of the commission opposed reconsideration.

Quast agreed with Commissioner Bob Jones of Seattle that the state could build a dam at Priest Rapids cheaper than an operating agency could, but said the PUDs should have a chance to take part in the power program.

The commission re-elected Walter S. Gordon of Tacoma as chairman for a one-year term beginning June 1. Roy Skill of Yakima will continue as vice-chairman, Quast as secretary. Skill will serve as the commission's representative on an interstate compact committee that is preparing a compact proposal for Pacific Northwest states dealing with Columbia River water resources.

Seattle City Light May Build Dam at Cedar Lake

Seattle City Council has been asked to allot $100,000 for studies to determine feasibility of building a $5,000,000 dam at the outlet of Cedar Lake to store water for consumption and for use in power generation.

Seattle City Light has a 30,000-kw power plant at Cedar Falls, below the lake, but this plant cannot be operated at capacity much of the time because the supply of water from the river varies with the seasons.

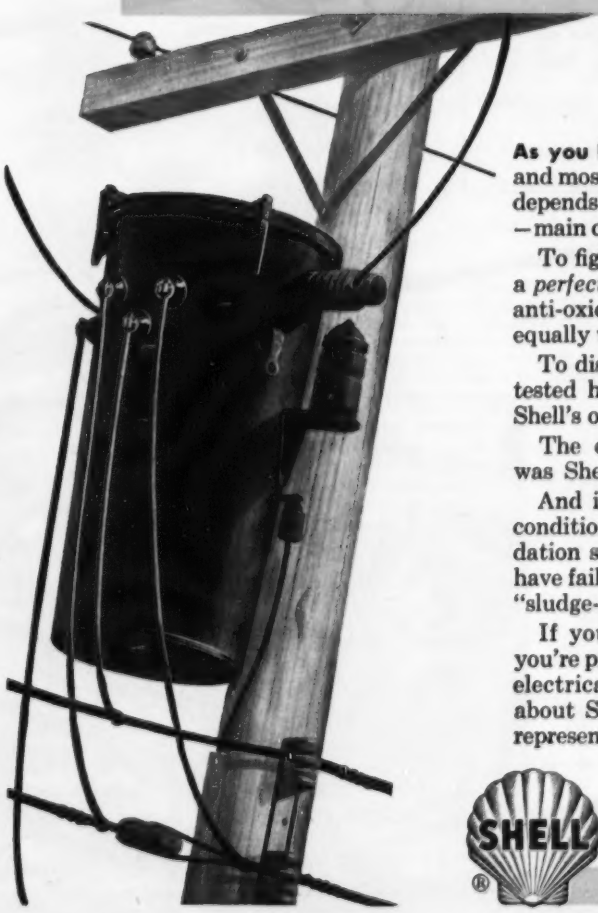
The project would be a joint venture of City Light with the City Water Department.

• **Job of rehabilitating** B. C. Power Commission's landslide-damaged Whatshan hydro plant near Needles, B. C., is moving along at a good pace with the advent of better weather, officials report. Tons of overburden are being removed from the slope from behind the power house to eliminate it as a future hazard. The power house superstructure has been reconstructed and interior work is continuing. Work is also proceeding on a new switchyard.

We can prove it...you can now get

3 to 5 times the usual service life

on all your electrical equipment...without frequent oil purification...without costly maintenance



As you know, "sludge" wrecks insulating oils . . . and most electrical equipment—*sooner or later*. It all depends on how effectively the oil "fights" oxidation—main cause of "sludge."

To fight oxidation most effectively, an oil must be a *perfect combination* of the very finest base oil and anti-oxidant inhibitor. But not all base oils respond equally well to given amounts of inhibitor.

To discover the best combination, Shell scientists tested hundreds of specially-refined base oils with Shell's own highly-effective inhibitor.

The one combination that proved *outstanding* was Shell Diala Oil AX.

And in actual use under the toughest operating conditions, this remarkable insulating oil resists oxidation so effectively that—*years* after ordinary oils have failed—Shell Diala Oil AX has been found to be "sludge-free"!

If you're not using Shell Diala Oil AX now—you're probably not getting full service life from your electrical equipment. Why not get the full story about Shell Diala Oil AX from your nearest Shell representative—*today?*

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IT'S HERE! *the* R&IE

with 5 EXCLUSIVE *features - -*

1. Corona free at 300 Kv to ground with switch closed and 275 Kv to ground with switch open — with less than 500 micro volts radio influence. Best R. I. V. test performance of any switch to date.
2. Only ONE exposed contact. — Hi-Pressure, plus blade rotation, equals self-cleaning. Straight line current path thru break contact — an advantage providing extra high momentary values.
3. Accurate dead center blade control crank driven by Torsional Interphase rods — provides impact-free movement of blade as it comes to fully open or closed positions.
4. Low operating effort thru weather protected counter-balanced mechanism and efficient gear reduction.
5. Sealed Pressure Hinge Contact with well established extra high momentary withstand factor.

IN addition to the many other outstanding design features that characterize

R&IE Switches

Compare these Facts

Illustrating ease of operation — only 30 pounds maximum required on 12 inch handle to engage contacts on above switch!

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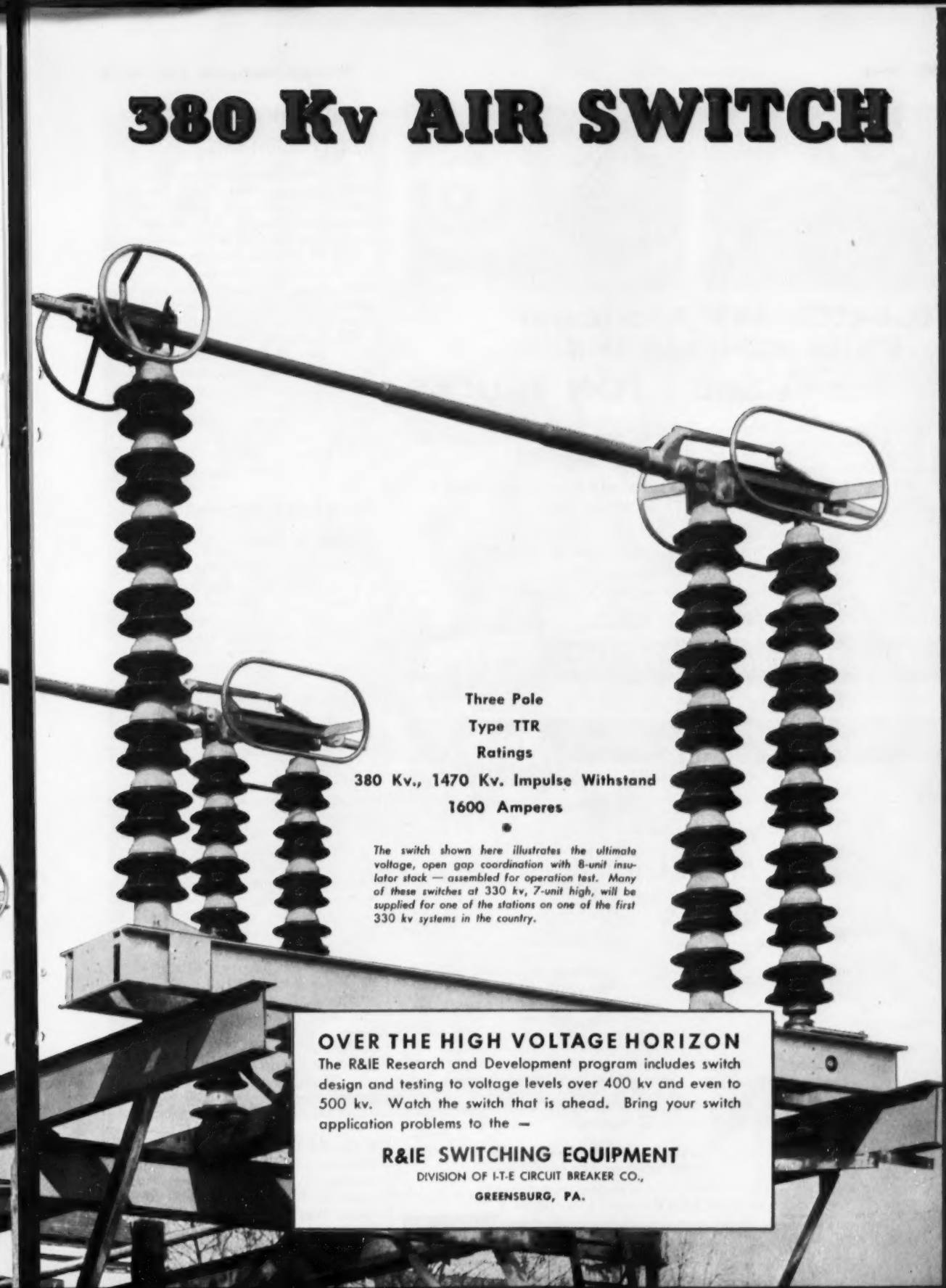
380 Kv AIR SWITCH



Three Pole

Type TTR

Ratings

380 Kv., 1470 Kv. Impulse Withstand

1600 Amperes

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The switch shown here illustrates the ultimate voltage, open gap coordination with 8-unit insulator stack — assembled for operation test. Many of these switches at 330 kv, 7-unit high, will be supplied for one of the stations on one of the first 330 kv systems in the country.

OVER THE HIGH VOLTAGE HORIZON

The R&IE Research and Development program includes switch design and testing to voltage levels over 400 kv and even to 500 kv. Watch the switch that is ahead. Bring your switch application problems to the —

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TEL-E-LECT "325" Attachment
. . . Derrick and Digger Unit
For 3/4 and 1-TON TRUCKS

Why send a five man truck and crew on pole replacement or service jobs that can now be handled by two men and a highly portable ¾ or one ton service truck? The "325" attachment makes it possible for two men to set up the derrick, attach the digger, dig the hole and set the pole ready for tamping *in less than ten minutes*! This set-up, with or without radio communication, speeds up line work and cuts costs way down.

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★ No more using five-man crews on two-man jobs

★ Sets poles up to 35'; take augers 8" to 20" diameter

★ Packaged unit for installation by your local mechanic

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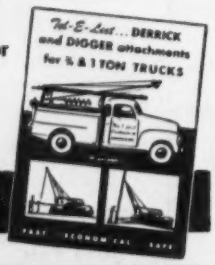

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There's *order* in this plant—and in the many, many other factories and offices equipped with Faraday signals and systems. They stop confusion and save steps, paging and signaling clearly and faithfully, day-after-day, year-after-year.

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BELLS · BUZZERS · HORNS · CHIMES · VISUAL AND AUDIBLE PAGING DEVICES AND SYSTEMS

JOINT DEDICATION FOR UTILITY ADDITIONS

Opening of new division offices and the completion of a 10,000-kw steam plant addition were celebrated by Public Service Co. of Colorado in a joint dedication at Alamosa, Colo.

The $1,750,000 addition to the steam plant raises its capacity to 20,750 kw. New offices for the San Luis Division of the company are housed in a two-story masonry structure.

The dedication featured guided tours through the steam plant. Visitors registered for an electric clothes dryer that was given away. An electric water heater was given away in the same manner at the downtown offices. Children were given helium-filled balloons and hot pad souvenirs were given adult visitors.

Arrow Lake Development Studied in Canada

Preliminary field surveys for a water storage dam on lower Arrow Lake, in Southeastern British Columbia, will be started soon by engineers of Kaiser Aluminum and Chemical Corp., according to Norman L. Krey, manager of northwest operation for the company.

Possibilities for development of the big dam north of Castlegar, which will be privately financed, have been discussed with the B. C. government and other sources.

"A dam in the Arrow Lake area would provide sufficient usable water storage for generation of sufficient power to firm up much of the interruptible supply which the company is now forced to use," Krey stated. "About 40% of Kaiser Aluminum operations in the northwest are now dependent upon delivery of interruptible power," he added.

• **Bonneville** Administrator William A. Pearl has reported that all Department of Interior offices in the Portland area designated for occupancy of the Lloyd Bldg. will be moved by June 1. The Interior Department has indicated that the structure, intended to place all of BPA's Portland offices under one roof, may be called the Interior Bldg.

• **Cowlitz County,** Wash., PUD Commissioners have approved work orders totaling $43,500 for capital outlays which include some $30,000 for the Olive Way substation in Longview, Wash., to double capacity. Manager Glenn Hittle reports the work includes new switching system and said he expects the new peaking capacity to be 11,000 kw.

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"Scotch" 33 Plastic Electrical Tape saves three ways at the power plant of a large utility in New England.

First, it *saves application time* since only one tape is needed for mechanical and electrical protection. And "Scotch" 33 conforms smoothly to odd-shaped surfaces, sticks tight with only slight finger pressure.

Second, it *saves space* since it's only 7 mils thick. Yet "Scotch" No. 33 has a dielectric strength of 10,000 volts per layer. Gives neat, compact results.

Third, it *saves money* since a little goes a long way. And "Scotch" 33 lasts longer, too.

Try this remarkably tough plastic tape yourself. See how it resists weathering, moisture, acids, oils and alkalies. See how it helps *you* save! For complete facts and specifications, write Minnesota Mining & Mfg. Co., Dept. EP-64, St. Paul 6, Minnesota.

3M COMPANY

The term "Scotch" and the plaid design are registered trademarks for the more than 300 pressure-sensitive adhesive tapes made in U.S.A. by **Minnesota Mining & Mfg. Co., St. Paul 6, Minn.**— also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

SCOTCH BRAND Electrical Tape No. 33

FINANCIAL AID TO HIGHER EDUCATION

Our Colleges and Universities Face Grave Financial Problems

For the past decade the nation's colleges and universities have been caught in a destructive financial squeeze. It is particularly destructive for the independent, privately endowed institutions. Unless extraordinary measures are taken to relieve this squeeze, it promises to become progressively worse. To let it do that is to court a national disaster.

This is the first of two editorials devoted to the financial plight of our colleges and universities. This first editorial deals with the character of the problem, present and potential. The second will indicate some things that need to be done about it, and particularly what American business might do.

Enrollment Soars, Income Lags

In broad outline, the financial problem that afflicts our colleges and universities is simple. The demand for their services has increased rapidly, and promises to keep on increasing even more rapidly. At the same time, their financial capacity to provide these services has lagged behind, primarily because of price inflation.

Between 1940 and 1950, college and university enrollment increased from approximately 1⅓ million to 2⅓ million—about 75 per cent. Over the same period, the educational income of these institutions, measured in terms of its actual purchasing power, increased only about 64 per cent. Thus, at the end of the decade, our colleges and universities as a group had, on the average, about 6 per cent less to spend per student than they had at the beginning. Meanwhile, the rapid advance of science and technology had made a good college or university course a much more expensive operation than it was in 1940. Since 1950, the latest date for which comprehensive figures are available, the financial squeeze on our colleges and universities has intensified, largely because of another wave of price inflation touched off by the Korean War.

Among the colleges and universities, the independent, privately endowed institutions are particularly hard pressed. In terms of actual purchasing power, the independent liberal arts colleges are now spending at least 20 per cent less per student than they spent in 1940. Public institutions of higher learning, supported out of tax revenues, have managed to increase slightly their expenditure per student. Otherwise, the financial squeeze on higher education as a whole would be even more severe.

Why Independent Colleges Are Hit Hardest

The principal reason why the independent colleges and universities are so hard up is the shrinkage in their income from endowments. These endowments, created in other days by gifts of generous benefactors to help pay the expenses of higher education, have been hit hard from two directions. During the war and post-war years, the tax collector took so large a part of the incomes and estates of wealthy people that this source of endowments has been greatly reduced. Over the same period price inflation cut in half the purchasing power of the income derived from existing endowments. In 1940 income from endowments provided 26 per cent of the total income of the independent colleges and universities. By 1950 it provided only 14 per cent. The figure is still lower today.

The financial plight of the independent colleges and universities is directly reflected in the salary status of their teaching staffs. In mid-1952 a national survey showed that, after adjustment for the increased cost of living, the salaries of those holding full professorial rank in these institutions were 12 per cent lower than they were in 1941-42. Junior teachers, with the rank of instructor, fared somewhat better. In terms of actual purchasing power, their salaries declined only 2 per cent over the 12-year period, largely because there is more direct competition for their services from industry. Over the same period, the real wages of industrial workers increased 55 per cent.

Time Will Not Provide a Cure

The plight of the colleges and universities, which is shared in some degree by all parts of our educational system, is not one that can be left to time for a cure. On the contrary, the financial problems of our institutions of higher learning will be intensified in the years ahead by the pressure of rapidly increasing enrollments. Present prospects indicate that during the next decade college and university enrollment will increase by about one-third, or from 2⅓ million to over 3 million. The problem of increased enrollments will become particularly acute toward the end of this decade when the babies born during the great surge of population in World War II are ready to enter college.

Such an increase in population as that now in prospect can be a tremendous asset to the nation. It is still a truth, even though it is worn a bit thin by frequent repetition at commencement exercises, that a nation has no resource more valuable than the education of its people. And the better the education, the more valuable the asset.

But to realize this, our colleges and universities must have the financial strength to handle the increased enrollments that face them in the years ahead. This means that we must relieve our independent colleges and universities, in particular, from the financial squeeze in which they are now caught and make them full partners in the economic well-being of the nation. Some of the means by which American business might help achieve this will be discussed in a second editorial.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

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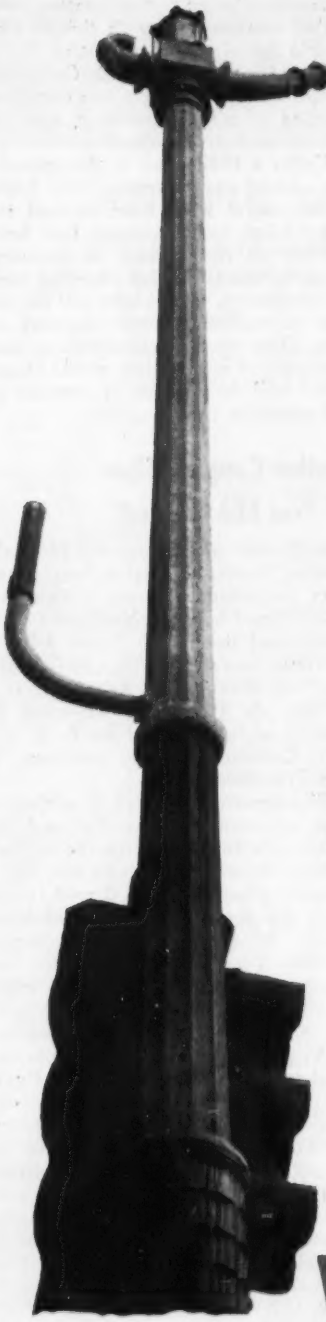
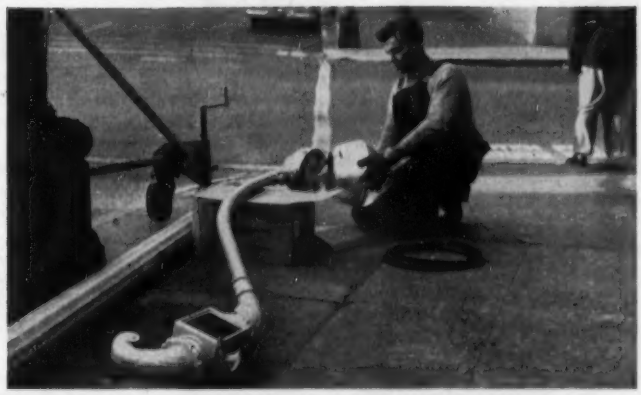


CARCO

Steel Light Poles



CARCO Light Pole Extensions Save Seattle Time and Money

1264 Poles Modernized

PACIFIC CAR'S versatility in the making of steel light poles was demonstrated during Seattle's recent conversion to mercury vapor luminaires in the main business district. Existing metal poles were utilized, signal wiring undisturbed and added height achieved by the use of 1264 Carco fabricated special pole extensions. Installation problems were simplified by designing the new pole extensions to slip-fit over existing lower pole sections after the top had been cut away. Pacific Car's light pole division is geared to help municipalities solve special light pole problems economically.

Standard Carco steel light poles . . . either anchor or transformer base . . . have many exclusive features that make for easy erection and maintenance, strength and permanence. Their versatility permits a wide latitude in mounting heights, bracket lengths and wiring. They are competitively priced and have been installed in many cities in the Middle West and West. We will be glad to help you with your light pole problems. Inquiries are invited.

Write our Light Pole Division for your copy of new catalog on Carco Steel Light Poles. We will gladly send you one on request.

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MERGER OF NORTHWEST COMPANIES COMPLETE

Merger of Pacific Power & Light and Mountain States Power companies was effective May 21, following approval by the Federal Power Commission and regulatory authorities of Oregon, Washington, Wyoming and Idaho.

The two companies announced prorated dividends to be paid stockholders on the basis of previously announced plans to coordinate dividend schedules.

Stockholders of record May 21 will be paid on May. 31. Pacific will pay 19½c per share on common and 28½c per share on preferred. Mountain States will pay 12c on common and 35¼c on preferred.

The board of the merged company will then be in position to consider payments of a second partial dividend to cover the period from May 21 to June 30. After that the dividend action of PP&L will be considered at regular quarterly intervals on a schedule formerly maintained by Mountain States.

Pacific, the surviving corporation, will issue a total of 36,496 shares of its 5%, $100-par-value preferred stock to present holders of Mountain's 5%, $50-par-value preferred on the basis of one share for each two of Mountain stock.

Pacific also will issue one share of a new series of $6.50-par-value common stock to its present common stockholders on a one-for-one basis, for a total of 2,204,278 shares and will issue 9/10 of a share of the new stock in exchange for each of Mountain's presently outstanding 1,250,000 shares of $7.25-par-value common. This will result in a total issue of 3,329,278 shares of the new stock.

Agreement on Flooded Land Will Take Time

Seattle City Light should not expect an early agreement with British Columbia on flooding of Canadian lands by the utility's Ross Dam on the Skagit River, Corporation Counsel A. C. Van Soelen has reported to Paul J. Raver, City Light superintendent.

Van Soelen reviewed for Raver a report from the International Joint Commission which met last month in Washington, D. C., to consider indemnity for the proposed flooding. The commission voted along strictly national lines, with the three Canadians outvoting the two Americans (appointment of a third American member is pending).

Seattle thought the matter was settled months ago, with British Columbia agreeing to payment of $255,508 by City Light. British Columbia authorities deny there was a complete meeting of minds, however, and refuse to execute a contract.

Under a 1942 order of the commission, based on a treaty, City Light could extend Ross Lake beyond the order when an agreement had been reached on the amount of damages. With British Columbia denying such an agreement, City Light will be unable to utilize storage capacity of Ross Dam to its fullest extent and downstream installations on the Skagit River will be unable to operate at full capacity.

Another Company Signs 20-Year BPA Contract

A 20-year power contract for California Pacific Utilities, patterned after the standard terms of those already signed between Northwest companies and Bonneville Power Administration, was signed May 17 in Portland by Bonneville Administrator William A. Pearl. The contract already had been signed by E. K. Albert, California Pacific president, in San Francisco.

The agreement, which is subject to final approval by Interior and the FPC, calls for service to the utility's eastern Oregon division by way of La Grande substation. Pearl said it was expected the company's purchases would be greatest during summer months when irrigation district customers and farmers call for as much as 20,000 kw additional energy.

• **A paid day off** for employee's birthday is provided in Pacific Power & Light Co.'s new agreement with International Brotherhood of Electrical Workers, Local 125, AFL, in lieu of an eighth holiday. The contract, retroactive to March 26, provides for an increase in wages of 1.15% and a journeyman's minimum scale of $2.65. PP&L Vice-president John Dierdorff said the birthday scheme granted the 560 IBEW members would be extended to apply to all of the investor owned utility's 1,250 employees.

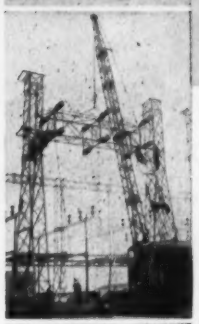
• **Members** of Electrical Workers Union 46 at Seattle are assessing themselves a dollar every three months for a "jury duty fund" to pay regular wages to any member called on a jury. Since the local has 2,400 members, this will bring in about $800 a month. The union took the stand that jury duty is a civic responsibility and that more working men should serve.

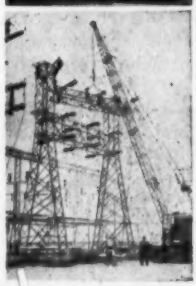
Pacific Structure Switch Units . . . Cut Costs, Improve Switching

PACIFIC ELECTRIC
INTEGRATED-DESIGN (I-D) STRUCTURE SWITCH UNITS

for many air-switch applications of Disconnecting, Sectionalizing, By Pass, Bus Transfer and Tie—15 kv to 115 kv

Other styles 7.5 kv to 330 kv





USUAL PRACTICE

1. Buy air switches.
2. Design, buy, and erect structure.
3. Mount switches on structure.

PACIFIC I-D PRACTICE

1. Buy integrated-design (I-D) structure switch units.
2. Erect them.

The three small views at left show four men and a crane erecting two Pacific structure switch units (110-5 kv) on tower column . . . Total Time ½ hour

Top Photo — 6-pole unit hoisted
Center Photo — 6-pole unit in place
Bottom Photo — 3-pole unit hoisted

50-ft. apparatus tower, 115 kv, with 6-pole Pacific YVW disconnecting switch and 3-pole YVW by-pass switch.

WHERE APPLICABLE, Pacific Electric Structure Switch Units of integrated design (I-D) reduce erection time, improve switch rigidity and alignment, and simplify control linkage.

Consider the pictured apparatus tower, for example—designed for disconnecting and by-pass (or bus tie) of a 115-kv circuit breaker. The six-pole disconnecting switch is an integral part of the box frame structure. Any two opposite insulator stacks are merely extensions of a single rotating "through" shaft. The shaft bearings support dead weight only; they do not have to resist cantilever stresses.

The PACIFIC (I-D) Structure Switch Units used in this tower provide the following advantages as compared with conventional construction . . .

- Eliminates six switch bases and fastenings.
- Eliminates one inter-phase control rod assembly.
- Switch alignment improved because bearings are not subjected to cantilever stresses. This permits greater leeway in bearing design. In these units the shafts run on stainless-steel rollers confined between stainless-steel inner races and bronze outer races —all protected by Neoprene shielding.

Pacific Structure Switch Units of Integrated Design (I-D) are not applicable to all conditions of air-switch installations. But a check of air-switching problems with Pacific Electric will disclose where they can be used to advantage.

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SUBSIDIARY OF FEDERAL ELECTRIC PRODUCTS COMPANY

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Sherman® Wedge-Grip CONNECTORS

SC-12X, SC-6 and SC-6X have extra reinforcing plate for additional thread strength.

SAVE YOU 50% IN COST!

THEY'RE SOLDERLESS . . . V CORRUGATIONS CLAMP WIRES SECURELY . . . HAVE NO SEPARATE PARTS . . . REQUIRE ONLY SCREWDRIVER, WRENCH OR PLIERS TO INSTALL!

PART NO.		B & S WIRE	
Plain Screw	Hex. Head Screw	Max.	Min.
SC-6	SC-12X	2-12 Solid	2-20
		2-6 Strand	2-12
	SC-6X	2-6 Strand	2-12
	SC-6X549	2-6 Strand	2-10
	SC-4X	2-4 Strand	2-8
	SC-2X	2-2 Strand	2-4

On many connections where you have made a slow, bothersome soldered splice or used more expensive connectors you can use "Wedge-Grips." These handy connectors help you stretch labor hours and keep costs down. Made of pure, high conductivity, hard drawn copper with bronze screws.

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ELECTRICAL FITTINGS FOR WIRE and CABLE

Overhanging branches removed and trees shaped properly for Utility in Beverly Hills

SURGICAL LINE CLEARANCE BY DAVEY

Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

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PUGET SOUND GROUP NOW FUNCTIONING

Puget Sound Utilities Council has been formed by Seattle and Tacoma City Light, Puget Sound Power & Light Co. and Snohomish and Chelan PUDs. (EWEST, May, p 138.) Headquarters are at Seattle.

Jack D. Stevens, former chief of power resources for Bonneville Power Administration, has been retained to direct an engineering survey. His report will show future power needs of the utilities in the council; projects that appear to have engineering and economic feasibility; steps to be taken to meet power needs in relation to load growth and economic aspects of the region. It will be used as a basis for selecting new projects for full-scale investigations.

Advertising placed in local newspapers states that council members agree it is their responsibility to take care of the total electric power needs of the Puget Sound-Cascade area; they anticipate that the area will require around 1,500,000 kw during the next 10 years, involving estimated capital outlay exceeding $500,000,000.

The council has no intention of assuming functions of any other entity or existing inter-related group, such as the Northwest Power Pool, it is pointed out.

Alternate Plan Offered For Regional Commission

The Washington PUD Assn. has endorsed recent action of the Northwest Public Power Assn. calling for a regional Columbia River Power Commission and has offered alternate plans as to how such a commission could be formed.

Under one plan, the President would name five members, with no more than three from one political party. Under the other, the President would appoint only one member, with the states of Washington, Oregon, Idaho and Montana each to select one more on a nonpartisian basis for staggered five-year terms. The commission would be chartered by Congress.

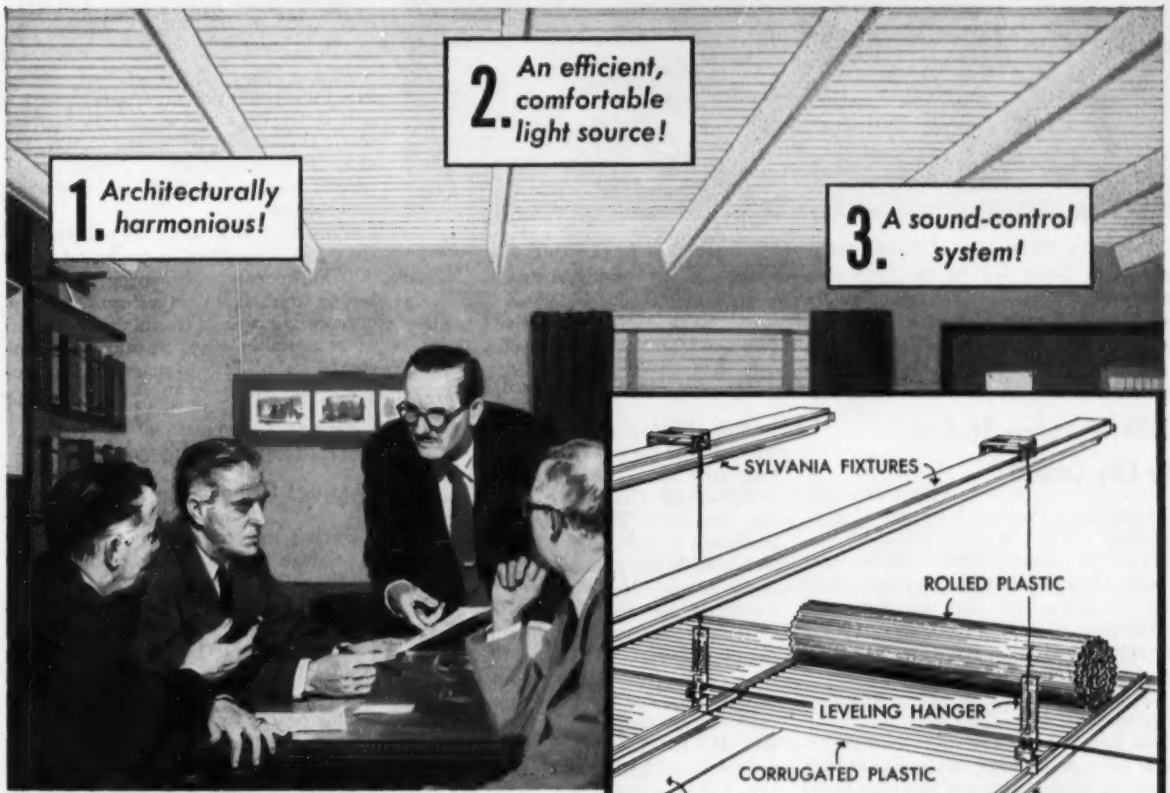
The federal government would give its existing power assets to the commission, which would assume the present debt of the facilities, about 75% of the original cost, and finance extensions by issuance of revenue bonds.

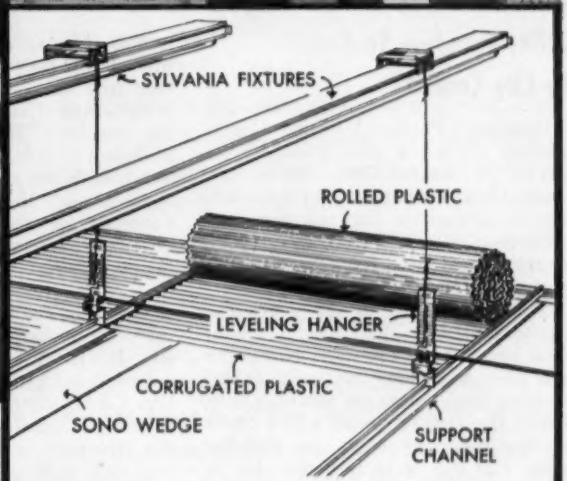
Future dams would continue to be built by the Army Engineers and the Bureau of Reclamation, who would bear the expense of irrigation, flood control and navigation.

Another Sylvania Achievement

SYLVAN-AIRE

A three-way functional treatment of beauty—sight—sound





Showing details of Sylvania's new functional Sylvan-Aire. For ease and economy of installation, wire supports shown here are attached to lighting fixtures instead of structural ceiling.

Adaptable! Easily Installed! Economical!

You never saw a more fascinating or a more functional system of sight and sound control! It's engineered by Sylvania to serve 3 ways!

1st ...it has the beauty and character of continuous corrugated white plastic.

2nd ...it is a source of soft, eye-pleasing over-all lighting.

3rd ...its inconspicuous V-shaped "Sono-Wedges," lined with thick glass-fiber pads, deaden noise...reduce distracting sound to comfortable levels.

In addition, the corrugated form of the plastic permits air to circulate along the supporting channels. Thus *air-conditioning* also can be effectively introduced.

Flexible in Design!

Sylvan-Aire's light weight and flexibility of design permit it to be readily and economically installed in any conference room, office or working area. Be sure to remind your electrical contractor friends about this latest Sylvania achievement. For full details write today to Dept. 4X-2606 at Sylvania.

SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, N.Y. 19, N.Y.

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LIGHTING • RADIO • ELECTRONICS • TELEVISION

CONSTRUCTION view of Dexter Dam, reregulating dam for Lookout Point project in Oregon. Being built by the Army Engineers, this is the last hydro structure in the currently authorized Willamette basin flood control project. In this photo the power house foundation is seen at left and fishways are visible in the foreground. Spillway section is 359 ft long and will be 90 ft high. Plans call for 15,000 kw installed capacity

Utility Franchise Studied By City Council

California-Pacific Utilities Co. is moving toward a new franchise for service in Baker, Ore., where city council last month passed at first reading an ordinance for the proposed agreement plus two contracts. Terms of the agreements have been under study since September 1953.

The franchise is for 10 years and provides the city shall receive 3% of gross revenues in the form of a privilege tax. A 10-year contract, tabled pending final action on the franchise, allows the city to install street lighting fixtures and wires on Cal-Pac poles. Cal-Pac is to pay the city 5c per pole for city poles used, estimated at $2.50 per month. The second contract is for electrical service and is a two-year term stipulation on rates, and payment regulations.

• **Home Light and Power** Co. of Greeley, Colo., has applied to Colorado Public Utilities Commission for a hearing to determine the company's fair rate of return and gross revenues to which it is entitled. After the hearing, the utility said it would file with the commission for a new schedule of electric rates to reflect the gross revenue. The company has never increased its rates since its incorporation in 1909.

• **Grays Harbor PUD** commissioners at Aberdeen, Wash., have approved a proposed revision in the residential rate schedule, affecting customers who use more than 1,200 kwh per month. Manager F. J. Robbins submitted the proposal, which calls for changing the base rate for all electricity over 1,200 kwh from 1¼ to ¾c per kwh. He also recommended inclusion of a demand charge of $1.50 per month for demands in excess of 10 kw, with the demand charge to continue for the 11 months subsequent to the establishmenmt of the demand.

• **Contract** for construction of a six-story office building in Victoria, for the B. C. Electric Co. has been awarded to Commonwealth Construction Co. Contract price was $1,000,000, BCE officials stated. Work on the structure will begin immediately and will take about 12 months to complete. Building will be reinforced concrete and glass.

• **Franklin County PUD,** Pasco, Wash., has awarded two contracts for enlarging its Franklin substation. General Electric Supply Co. received a $35,669 contract for substation equipment. A contract for 7,200 ft of underground cable to replace overhead circuits connecting with BPA's transmission system was won by General Electric on a bid of $2,555 per 1,000 ft of 500,000 cir mil cable and $1,598 per 1,000 ft of 4/0 cable.

• **Metlakatla Indian Community** has received a low bid of $107,600 from the Newport News Shipbuilding & Drydock Co., Newport News, Va., for 1,750-hp hydraulic turbines to be installed in the Community's Purple Lake power project on Annette Island, Alaska.

COMPANY ASKS FOR ITS FIRST RATE INCREASE

Public Service Co. of Colorado has asked the state Public Utilities Commission for a 12.96% electric rate increase. The raise, which would be the first in the company's history, would boost revenues $3,879,000 annually. Gross revenues in 1953 were $29,929,000, according to Vice-president W. D. Virtue.

Virtue told the PUC at initial hearings that the company's return was 5.2% on a net electrical department investment of $150,275,406. He said the proposed rate increase would give a return of 6.75 on electrical investment.

President J. E. Loiseau pointed out that $54,000,000 of a proposed $69,000,000 construction program must be secured from investors. "If our company is to attract this new capital at reasonable costs, it must demonstrate its ability to earn a fair return," he said.

New Accounting Procedure Receives Commission Okay

Permission to use an accounting procedure that would eliminate fluctuations in its income account resulting from rapid amortization of emergency facilities has been granted Pacific Gas and Electric Co. by the California Public Utilities Commission.

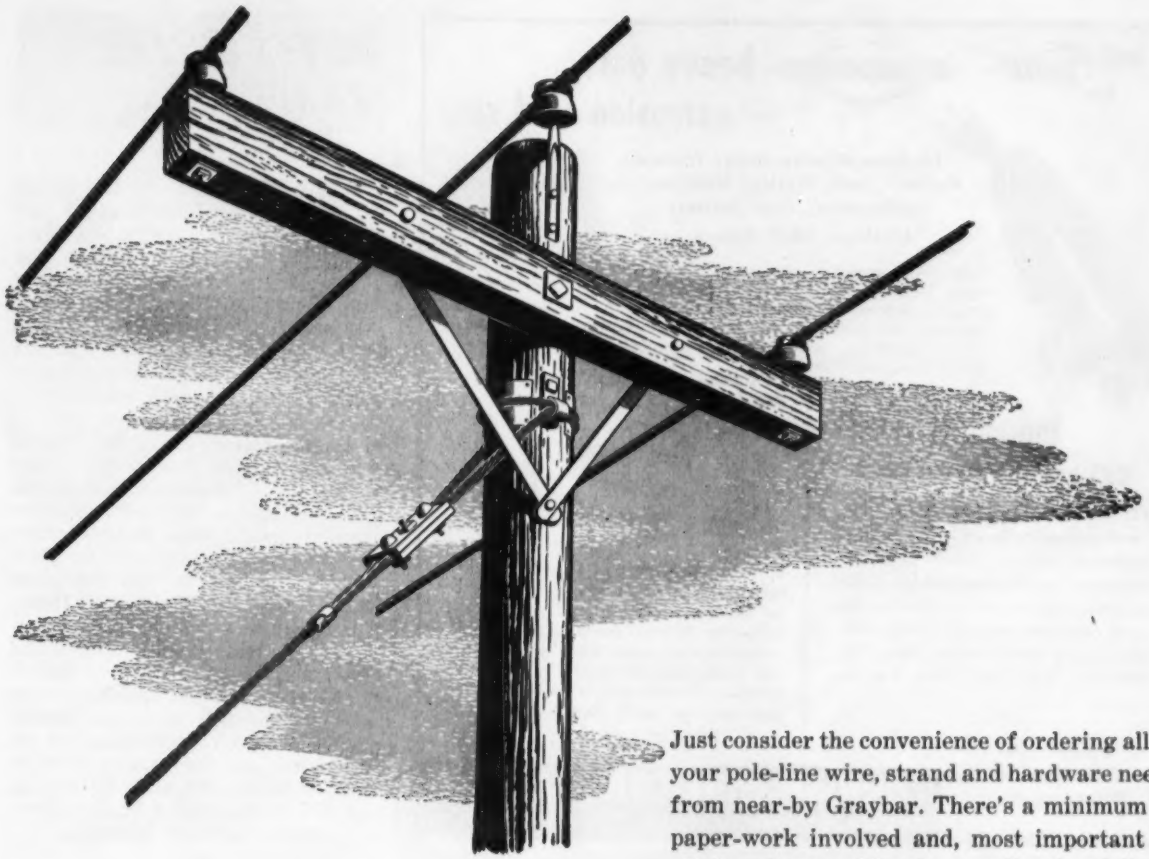
During the amortization period the utility wants to charge the tax reduction to its income account, transferring the amount to a newly created restricted surplus account.

The tax increase during the post-amortization period also would be compensated for. An amount equal to the yearly increase would be transferred from the restricted surplus account and credited to the income account.

PG and E has certificates of necessity permitting rapid writeoff of $104,792,110 of expenditures for emergency facilities. Applications are pending for certificates for additional expenditures of $12,460,077.

Tax reductions of about $48,173,500 accruing over a 60-month period would be transferred to the new restricted surplus account. The utility says the new accounting procedure, which has been approved by the Federal Power Commission, would enable it to raise about $50,000,000 from internal sources for construction purposes.

The utility has elected to start accelerated amortization of each new facility the year after its completion.



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3344	25 ft.	16/2 16/3SJ
3345	50 ft.	16/2 16/3SJ
3346	25 ft.	14/2 26/3SJ
3347	50 ft.	14/2 26/3SJ
3348	100 ft.	14/2 26/3SJ

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NOTES ON THE TRADE

• **Wagner Electric** Corp. has moved its Los Angeles branch office and warehouse operations to a new plant at 614 Lairport St. in El Segundo. The modern plant has 22,500 sq ft of floor space. Customer parking area, modern truck handling facilities and a spur track for direct rail service are provided. **L. G. Tandberg** is manager of the electrical branch office.

• **Initial signing** of a $60,000,000 contract between Snowy Mountains Hydro-Electric Authority of Australia and the Kaiser-Walsh-Perini-Raymond group of United States contractors took place recently at the Australian Consulate in San Francisco. Kaiser Engineers Division of Henry J. Kaiser Co., Oakland, Calif., sponsor of the joint-venture group, and General Construction Co. of Seattle signed the contract, which will be taken East to other participating companies. The project will include a 26-ft-diameter concrete tunnel 14 miles long, a concrete arch dam 290 ft high and 175 ft long and a smaller diversion dam in southeast Australia.

• **North Bay Electric Works** Inc. of San Rafael, Calif., has been appointed a distributor for U. S. Rubber Co.'s Uskon electrical radiant heating panels, for use in homes and industrial or commercial buildings. Territory will include San Francisco, Oakland, Stockton and the Bay Area. **Francis L. Auger** is vice-president of North Bay.

• **Latest light-metal brazing** techniques are demonstrated in a new color movie offered for group showing by Aluminum Co. of America. Titled "New Horizons in Aluminum Brazing," the 16-mm sound film runs 22 minutes. Requests for prints should be made on business letterhead to Motion Picture Section, 854 Alcoa Bldg., Pittsburgh 19, Pa.

• **Pacific Electric Motor** Co. of Oakland announced changes in management following the death of Frank E. Boyd. **W. E. Boyd** is now president. **Mrs. Josephine C. Boyd** is vice-president; **K. M. Noble,** secretary; **Mrs. M. Holland,** treasurer.

• **In a new sales policy** Allis-Chalmers is offering to deliver a JFR pole-type distribution regulator for 30-day inspection without cost to any recognized distribution system.

• **Mullenbach Electrical Mfg.** Co. of Los Angeles has announced the formation of two separate operating divisions for the manufacture and sale of its products. **Louis S. Deris,** formerly vice-president in charge of sales, has been made vice-president and general manager of the Electrical Equipment Division, which will be located at 2100 E. 27th St., Los Angeles 58. **Wayne M. Bitting** and **Lloyd J. Deris** will be sales managers of this division. The new Electronic Division, which will have its own management, will be located at the same address.

• **Charles H. Cutter** of Seattle, for 25 years representative for Pacific Electric Mfg. Co., has been appointed regional coordinator for Federal Electric Products Co. of Newark, N. J., which acquired Pacific Electric last year. Cutter's territory covers Washington, Oregon, Idaho and Montana. Shaffer & Nelson are Northwest agents for Federal. **Eric Nelson** handles the Seattle district and **John Shaffer** the Portland area.

• **Tri-State Supply** Corp. has been made exclusive West Coast sales agent for Hollingsworth & Vose Co.'s insulating papers. With offices in Los Angeles, San Francisco and Seattle, Tri-State will represent H&V in California, Oregon, Washington, Arizona, Idaho and Nevada. Samples of the papers are offered by Tri-State.

• **J. H. "Jack" Stumph** has been appointed Northwest representative for Bronco portable cords and cables. He will operate under his own name at 1000 Fourth Ave., Seattle 4. A complete warehouse stock of Western Insulated Wire Co. products will be maintained at that address. Stumph's territory includes Oregon, Washington, Idaho and Montana.

• **Production capacity** at Portland and Stockton, Calif., plants of McCormick and Baxter Creosoting Co. has been increased by installation of additional pressure-treating equipment, according to **Charles R. McCormick** Jr., president of the wood preserving firm. Two new preservatives have been added, he reported. The firm specializes in treatment of Douglas fir poles, piling, ties, etc.

• **Contract** has been signed between Four Wheel Drive Auto Co. of Clintonville, Wis., and the Hall Machine & Iron Works of Sedro Woolley, Wash., giving exclusive sales rights for all products made by the Washington firm to FWD Co. Hall Machine & Iron make a heavy-duty brush cutter (built in three sizes), brush log and tailgate spreader.

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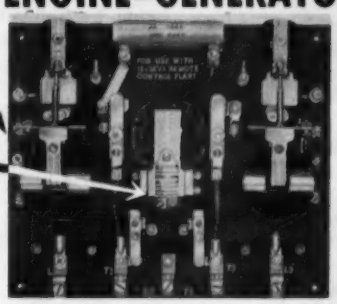

Engine-Generator Control also termed Demand Start, Load Start, Fully Automatic and Lamp Start Relays

- **The Load Itself Starts the Engine**
- **Protects Against Stalling**

This ASCO control is so designed that when any load is turned on—lights, motor, heating unit—any load, the power unit automatically starts. No master switch to throw first. And when all loads have been disconnected the plant stops.

This Control also has a built-in 'anti-stalling' device which automatically holds off the load until voltage and frequency are at their proper ratings. Then and only then is the load connection completed.

Other features include: no critical relay adjustments; pilot contacts for starting contactor, magnetic grounding, and battery charging; no residual magnetism sticking on relays.

Ratings from 2 to 37.5 kva (open or enclosed); minimum starting load 60 to 200 watts; 2 or 3 wire, gasoline or diesel engine generators.

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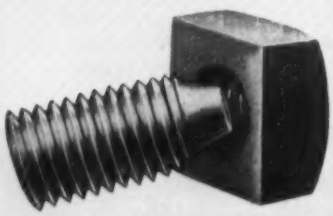

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HONOLULU, T.H.

NEWS ABOUT PEOPLE

• **Robert A. Neal,** Pacific Coast vice-president of Westinghouse Electric Corp., retired recently after 44 years of service. Neal played a major role in development and manufacture of electric switchgear and during World War II supervised the building at East Pittsburgh of special equipment that Westinghouse supplied for the atomic energy plant at Oak Ridge, Tenn. He received the Westinghouse Order of Merit in 1937. He was chosen to direct Western operations of the company when Westinghouse acquired its Sunnyvale, Calif., plant seven years ago. Previously he had served as vice-president in charge of apparatus sales, manager of electric utility sales and manager of the switchgear division at Pittsburgh.

• **Walter J. Maytham** of San Francisco has been elected a vice-president of Westinghouse Electric Corp. As Pacific Coast regional manager, Maytham since 1949 has directed the sales, service and repair of company products in nine Western states, Alaska and the Hawaiian Islands. In 1950 the company conferred upon him its highest honorary award, the Westinghouse Order of Merit.

• **Distinguished Service Award** of the American Public Power Assn. was made to **Samuel B. Morris,** general manager and chief engineer of the Los Angeles Department of Water & Power. Presentation was at Chicago, where Morris was a speaker for the annual meeting of the organization. The citation praised him for his long and outstanding service to his community, the nation and the association.

• **E. E. MacGilvra** has been appointed to a newly created position as executive assistant at Montana Power Co. by J. E. Corette, president and general manager. With Montana Power since 1935, MacGilvra for many years has represented the company in matters involving lands, claims and rights-of-way. He will continue these duties in his new position, and also will assist company executives, managers, and department heads.

• **U. S. Steel's** Columbia-Geneva Steel Division has appointed **H. M. Gage** assistant to director of purchases and **L. Wilson Thomas Jr.** as sales training supervisor.

• **Jack D. Stevens** has been retained by Puget Sound Utilities Council of Seattle to direct its survey of power resources and needs. He has been chief of power resources for Bonneville since 1946 and, before he joined BPA in 1939, he was with Pacific Gas and Electric Co. He has been a Bonneville representative on the Northwest Power Pool since its inception in 1942 and is a member of the water management committee of the Columbia Basin Inter-Agency Committee and of the engineering committee of the Northwest Governors' Power Resources committee.

• **Appointment** of **John Y. Lansing,** former assistant to the manager of Columbia Empire Industries Inc., to the position of assistant vice-president of Pacific Power & Light Co. has been announced by President Paul B. McKee. Lansing, whose work has been concerned with public relations activities of the 700 member firms of the industries group, will have similar duties with the utility at Portland headquarters and in the field.

• **Lea Phillips,** for five years master of ceremonies for Pacific Power & Light Co.'s radio show at The Dalles, Ore., has joined the company at Portland headquarters as sales promotion manager. He has had nine years in radio work in The Dalles and Pendleton.

• **Two former Westerners** have been given increased responsibilities with Ebasco Services Inc. **W. H. McInnis,** at one time with Sierra Pacific Power Co., was made manager of Ebasco's sales, marketing and public relations department and **M. G. Kennedy,** formerly with Pacific Power & Light Co., was made assistant manager of the department.

• **Cecil C. Coulter** has been appointed to the Los Angeles office as field sales representative for General Electric's Air Conditioning Division. **J. H. Shoemaker** has been employed at San Francisco in sales of home heating and cooling equipment.

• **For a suggestion** that resulted in saving the lives of migrating deer that fall into Pacific Gas and Electric's power canal near Westwood, Calif., two electric department foremen won a $500 award from the company. The pair are **Ernest H. Dean** and **Louis E. Landrum.**

• **Robert A. Bateman** has been appointed manager of public relations for Kaiser Engineers Division of Henry J. Kaiser Co. His offices are in the Kaiser Bldg., Oakland, Calif.

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• **Robert B. Jenkinson,** long-time employee of the Corps of Engineers prior to his retirement last December, has accepted a position as resident engineer on a power project to be constructed for the government of Burma under the design and supervision of Knappen-Tippetts-Abbott-McCarthy. Jenkinson's headquarters will be in Rangoon. With the Corps for 28 years, he helped build major dams in the United States. He was project engineer for a time on the Pine Flat Dam on the Kings River and Folsom Dam on the American River, in California. At the time of his retirement he was special assistant to the district engineer in Sacramento, Calif.

• **Retirement** of **Ralph W. DuVal** and promotion of **Frederick T. Searls** to succeed him as rate attorney for Pacific Gas and Electric Co. were announced recently by Robert H. Gerdes, vice-president and general counsel. DuVal, who becomes special attorney for the company, has had 41 years' service. Searls has been a member of the PG and E law department since 1936; was on leave from 1942 to 1946 to serve as an Air Force intelligence officer. Overseas two years, he left the service with the rank of lieutenant colonel.

Deaths

• **A. S. Moody,** retired commercial vice-president of General Electric Co., died May 6 in Portland. A graduate of the University of California, he started his career in 1906 with the Stanley Co., then owned by G-E. In 1908 he was transferred to Seattle by G-E and in 1910 was made manager of the supply department in Portland. In 1923 he went to Los Angeles as manager and in 1924 was made Northwest manager. He was commercial vice-president in charge of the Pacific Northwest District when he retired in November 1948.

• **Benjamin F. Annis,** 46, purchasing agent for Montana Power Co., died recently in Billings following surgery. He had been with the company since 1936.

• **Arthur William Elliott,** former assistant business agent in the Los Angeles Department of Water & Power, who retired in 1946, died May 10 at the age of 73.

• **Carl E. Becraft,** 69, former superintendent for Montana-Dakota Utilities Co. at Miles City, Mont., and an electrician at Prineville, Ore., until his recent retirement, died at Prineville recently.

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INTERRUPTING DEVICE FOR ALL AIR SWITCHES

VERTICAL, HORIZONTAL, HOOK STICK

for opening line charging currents, transformer magnetizing currents and small load currents at voltages from 15 KV to 161 KV.

Easily Installed on Switches Now in Service

Necessary phase spacings and clearances are not increased by the addition of the "QB" Device. The current path through a closed switch is through its main blade and contacts. The quick break blade is not in the current path until the switch starts to open; then the current is transferred from the main switch contact to the quick break blade.

Simple, Positive—No Additional Effort Required in Opening Switches When Frozen

The quick break blade is carried without extra effort. Ice on the main switch blade and contact is broken before effort is expended in breaking the ice on the "QB" attachment.

Spring and Current Carrying Members are Independent

Spring actuated quick break blade is mounted on the switch contact stack. This design permits the use of a more substantial construction, a heavy independent spring driving mechanism and much greater opening speeds.

"QB" Quick Break Device applied to a MK-40 Vertical Break Switch.

Fig. 1—Vertical Switch blade (A) is closed into the main contact (B) and the quick break blade (C) is in neutral position.

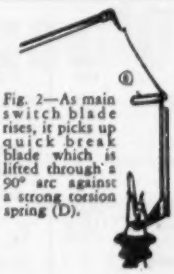

Fig. 2—As main switch blade rises, it picks up quick break blade which is lifted through a 50° arc against a strong torsion spring (D).

Fig. 3—Quick break blade released when main switch opened to about 50° returns to neutral position at a very high speed.

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PROFILES

Bruce Hannah of Grabe Electric in Tucson, now president also of Tucson Appliance Merchandisers Assn., receives a copy of the TAMA ad from Ray Cox, the association's manager. Only started this year the organization already has grown to some 55 members, has a calendar of promotions and is initiating a number of services to members

J. E. Jones

W. J. Maytham

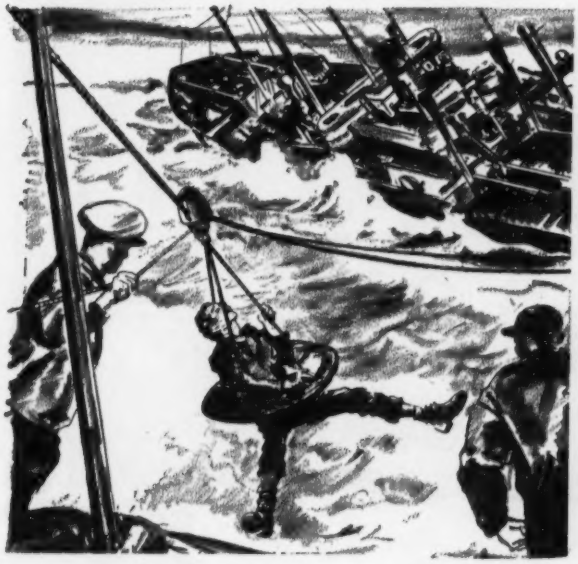
Walter J. Maytham, Pacific Coast regional manager of Westinghouse Electric Corp., has been made a company vice-president

Floyd Shipp is the new manager of the Utah-Idaho Chapter of National Electrical Contractors, headquartered in Salt Lake City. Prominent in Boy Scout work and other civic activities, he was partner with his brother in Shipp Electric Co. of Midvale and before that with G-E's construction materials department in San Francisco

J. E. Jones has been named district product service manager for Hotpoint Co., with headquarters in the San Franicsco office

Floyd Shipp

LIFE LINES



Lifelines of Priceless Service...the Breeches Buoy...the Electrical Underground Cables!

Public utilities, municipalities and electrical contractors everywhere rely on ORANGEBURG FIBRE CONDUIT to protect their lifelines — keep them healthy and long-lived.

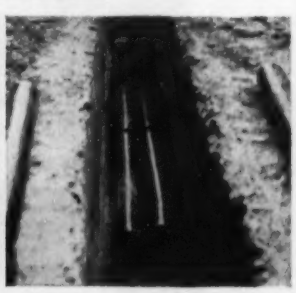
The Many Advantages of Using Orangeburg Fibre Conduit

- It is non-metallic — no corrosion.
- Its impermeable wall and tight joints keep the ground waters out.
- Its smooth bore and low coefficient of friction safeguard the cable sheaths from abrasion — when pulled in — and later from cable movement.
- Orangeburg is strong and tough — *gives* without breaking.
- Service records go back 61 years.

ORANGEBURG with its long lightweight lengths, easily assembled joints, angle couplings, bends, and other standard fittings, simplifies installations.

For complete cable protection at lowest possible cost be sure to specify Orangeburg Fibre Conduit. For more complete information send to Dept. W-54

ORANGEBURG MANUFACTURING CO., INC.
ORANGEBURG, NEW YORK
West Coast Plant, Newark, Calif.



ORANGEBURG FIBRE CONDUIT

STANDARD with concrete encasement **NOCRETE** without concrete encasement

GENERAL ELECTRIC SUPPLY COMPANY
A Division of General Electric Distributing Corporation

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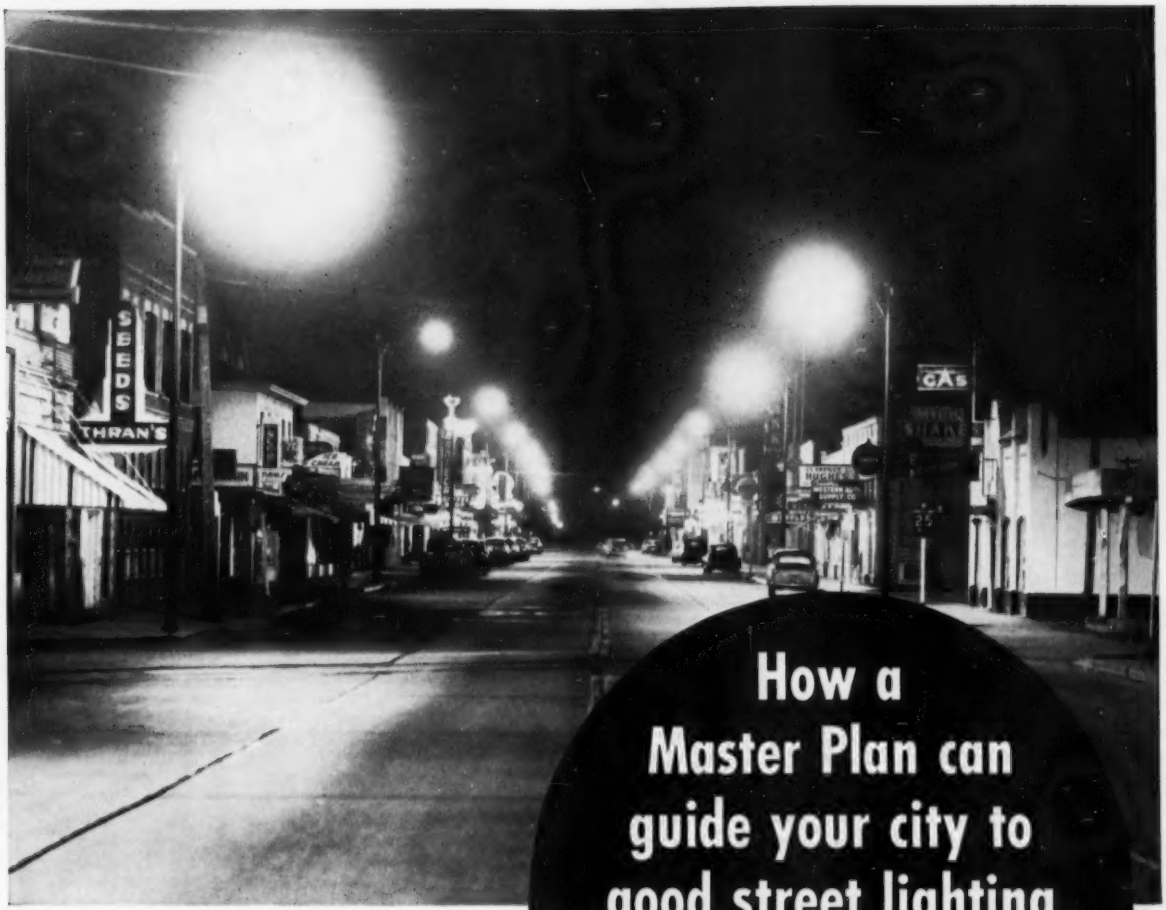
AIR BREAK DISCONNECTING SWITCH
69,000 Volts—600 Amperes
Type O-2
Vertical Break, Three Pole, Single Throw
Group Operated—One Pole Shown
HIGH PRESSURE SILVER TO SILVER CONTACTS
See Bulletin 46-A



How a Master Plan can guide your city to good street lighting for years to come

Here's what one did for Manteca, Calif.

Modern street lighting like this, recently installed in Manteca, Calif., is based on a Master Plan drawn up by P. G. and E. to cover the city's needs for at least 10 years. Manteca's new system produces over 3 times as much light per operating dollar as its old one, and can be expanded gradually to keep up with changing needs.

"Our new lighting system gives Manteca a brighter, cleaner look, makes our streets a lot safer at night. And with a Master Plan to follow, we'll no longer have any doubts that our lighting is all it should be," says the Honorable Carl N. Hansen, Mayor of Manteca.

P. G. and E. will gladly make a free survey of your city's street lighting and submit a Master Plan for any improvements needed. Remember: good street lighting is more than paid for by the saving of lives and property. And long-range planning enables you to spread the relatively small cost over a period of many years.

For a free survey of your city's street lighting, contact your local P. G. and E. Office.

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

404-X-254

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P C E

A

Keep your eye on the...

May we direct your particular attention at this time to the "A" in "P.C.E.A."? It stands for "Association"—and we'd like to emphasize that the men and women of P.C.E.A. are associated in working for the good of the electric industry. If you are connected with the electric industry, they're friends of yours. Why not join them?

P.C.E.A. offers each member the opportunity to serve the industry in the way which best suits his individual interest, talent and experience. This "do something" organization has an unusual number of active projects—and at least one of them is right down your alley. We invite your participation. As a full-fledged "associate" you can serve your friends, your industry and yourself. Get full information from either of our offices.

Associations do these things which most people think just happen.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 WEST SIXTH STREET, LOS ANGELES 14, CALIF.

681 MARKET STREET, SAN FRANCISCO 5, CALIF.